REPORT RESUMES

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RESEARCH CONFERENCE IN AGRICULTURAL EDUCATION (20TH, UNIVERSITY OF NEBRASKA, AUGUST 2-4, 1966).

BY- KAHLER, ALAN AND OTHERS

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DESCRIPTORS- *AGRICULTURAL EDUCATION, *EDUCATIONAL RESEARCH, *RESEARCH METHODOLOGY, *INFORMATION DISSEMINATION, *ADOPTION (IDEAS), CONFERENCES, RESEARCH COORDINATING UNITS,

FIFTY-FOUR PARTICIPANTS FROM NINE STATES ATTENDED THE CONFERENCE TO DISCUSS REGIONAL RESEARCH, METHODOLOGICAL IMPROVEMENTS, AND NEW AREAS OF RESEARCH. TEXTS OF MAJOR SPEECHES GIVEN AT THE CONFERENCE ARE INCLUDED--"RESEARCH IN EDUCATION" BY W. K. BEGGS, "THE CHALLENGE TO SOCIAL SCIENCE RESEARCH IN AGRICULTURE," BY HOWARD W. OTTOSON, "RESEARCH DESIGN" BY D. J. SJOGREN, "A PRACTICAL APPROACH TO DISSEMINATING THE FINDINGS OF EDUCATIONAL RESEARCH," BY K. E. SHIBATA, "A PROGRAM PLANNER LOOKS AT ADOPTION RESEARCH" BY A. E. LUTZ, "EVALUATION OF RESEARCH" BY V. E. CHRISTENSEN, "DIFFUSION AND ADOPTION OF RESEARCH RESULTS" BY W. C. MEIERHENRY, AND "THE ROLE OF THE RESEARCH COORDINATING UNIT IN VOCATIONAL EDUCATION," BY K. E. SHIBATA. COMMITTEE REPORTS ON RESEARCH DESIGN AND DEVELOPMENT, DISSEMINATION AND ADOPTION OF RESEARCH RESULTS, AND EVALUATION OF RESEARCH AND SUMMARIES OF THE FOLLOWING GRADUATE STUDENT RESEARCH ARE INCLUDED--"VOCATIONAL COMPETENCIES AND THE LOCI OF INSTRUCTION FOR THE PERFORMANCE OF THE SALES FUNCTION IN THE FEED INDUSTRY," BY J. J. ALBRACHT, "SOURCE AND EXTENT OF ECONOMIC COMMITMENTS TO PUBLIC VOCATIONAL EDUCATION IN MINNESOTA AND THEIR EFFECTS ON THE NATURE OF TRAINING OPPORTUNITIES," BY C. L. NELSON, "EDUCATIONAL RESTRICTIONS TO AGRICULTURAL SUCCESS AND THE RELATIONSHIP OF EDUCATION TO INCOME AMONG FARMERS," BY E. A. PERSONS, AND "CAREER PATTERN ANALYSIS OF A SELECTED GROUP OF FORMER VOCATIONAL TEACHERS," BY J. F. THOMPSON. (JM)

ED016056

TWENTIETH ANNUAL
RESEARCH CONFERENCE IN AGRICULTURAL EDUCATION

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Central Region
August 2-4 1966

University of Nebraska

Prepared by
Department of Agricultural Education
University of Nebraska
Lincoln, Nebraska

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TWENTIETH ANNUAL CENTRAL REGIONAL RESEARCH CONFERENCE IN AGRICULTURAL EDUCATION

Alan Kahler - Chairman
Garfield McCreight - Secretary
H. W. Deems - Local Committee
J. T. Horner - Local Committee
U. E. Wendorff - Local Committee

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Ray Agan, Kansas
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John Coster, Nebraska
Alan Kahler, Nebraska

University of Nebraska
Lincoln, Nebraska

August 2-4, 1966

ROSTER

REGIONAL CONFERENCE ON AGRICULTURAL EDUCATION RESEARCH

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51. Richard Wilson, 101 Garden Rd., Columbus, Ohio 43214

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53. Dale Zikmund, 6525 Hartley, Lincoln, Nebraska 68507

54. Virgil Christensen, Ohio State University, Columbus, Ohio 43212

Central Region Research Conference
in
Agricultural Education

August 2, 3, 4

University of Nebraska
Lincoln, Nebraska

Conference Schedule

Tuesday, August 2

A.M.

8:30 Registration: Second Floor Lobby, Nebraska Center for Continuing Education

9:30 General Session
Presiding: H. W. Deems
Welcome: Merk Hobson, Vice-Chancellor for Instruction, Dean of Faculties, University of Nebraska
Call to Conference: J. T. Horner, Chairman, Department of Agricultural Education, University of Nebraska
Organization of Conference: Alan Kahler, Assistant Professor, Agricultural Education, University of Nebraska
"Research in Education" Walter K. Beggs, Dean of Teachers College, University of Nebraska
Discussion and Questions

10:30 Coffee Break

10:45 "A National Look at Research in Agricultural Education."
Byron Rawls, Regional Consultant in Agricultural Education, U. S. Office of Education, Kansas City, Mo.

Discussion and Questions

P.M.

1:30 General Session
Presiding: M. G. McCreight
"Challenges in Social Science Research in Agriculture."
Howard W. Ottoson, Professor and Chairman, Department of Agricultural Economics, University of Nebraska

Discussion and Questions

2:45 Coffee Break

3:00 Reports on Graduate Student's Research
Participants and places to be announced.

Wednesday, August 3

A.M.

8:00 General Session
Presiding: U. E. Wendorff
Symposium on Research

Design -- Dr. Douglas Sjogren, Associate Professor, Director of Research, Division of Vocational Education, Colorado State University

Dissemination -- Dr. Kenneth Shibata, Operations Director, Research Coordinating Unit, University of Nebraska

Adoption -- Dr. Arlen Lutz, Associate Professor, Department of Agricultural Education, Extension Programs and Reports, University of Nebraska

Evaluation -- Dr. Virgil Christensen, Research Specialist, Center for Vocational and Technical Education, Ohio State University

10:00 Committee Work Sessions

Committee A -- Design and Development, Minden Room, Co-Chairmen -- Forrest Bear and Carlton Johnson, Consultants -- Douglas Sjogren and Virgil Christensen

Committee C -- Dissemination and Adoption, Kearney Room, Co-Chairmen -- C. E. Bundy and Burneil Gingery, Consultants -- Kenneth Shibata and Arlen Lutz

Committee E -- Evaluation, Alliance Room, Chairman -- Richard Wilson, Consultant -- Virgil Christensen

12:00 Lunch

P.M.

1:00 General Session
Presiding: Thomas Lyons
"Diffusion and Adoption of Research Results". Wesley Meierhenry, Assistant Dean of Teachers College. Professor of History and Principles of Education and Educational Administration, University of Nebraska

Discussion and Questions

Wednesday Program Continued

3:00 Coffee Break

3:15 Committee Work Sessions

6:30 BANQUET: Omaha Room, Nebraska Center for Continuing Education

Toastmaster: James T. Horner, Professor and Chairman, Department of Agricultural Education, University of Nebraska

Professional Entertainment -- Jim Fras, Lincoln, Nebraska

Speaker: Donald Clifton, Associate Professor, History and Principles of Education and Educational Psychology and Measurements, University of Nebraska

Thursday, August 4

A.M.

8:30 General Session
Presiding: Roland Peterson
"Role of Research Coordination Units in Carrying Out Research in Agricultural Education." Kenneth Shibata, Operations Director, Nebraska Research Coordination Unit

Discussion and Questions

9:45 Coffee Break

10:00 Final Committee Work Session

12:00 Lunch

P.M.

1:00 General Session
Presiding: Virgil E. Christensen
Report: National Research Center -- Virgil Christensen
Report of Committee Secretaries

2:15 Coffee Break

2:30 Plans for 1967 Conference

Adjournment

Central Region Research Conference
in
Agricultural Education

LADIES PROGRAM

August 2

A.M. Hostesses: Mrs. M. G. McCreight and Mrs. Alan Kahler

9:30 Tour of Nebraska State Capitol Building

10:30 Tour of Governors Mansion as guests of Mrs. Frank Morrison, Wife of the Governor

11:45 Luncheon, Black Coach Supper Club, Arapahoe at 10th Street.

Luncheon Speaker: Dr. Audrey Newton,
Chairman, Clothing and
Textiles Department,
College of Home Economics,
University of Nebraska

Those interested in taking part in the tour and attending the luncheon should meet in the lobby of the Nebraska Center at 9:00 a.m.

P.M.

8:00 Reception, Columbus Room, Nebraska Center for Continuing Education.
Hosts: Dr. & Mrs. James Horner
Dr. & Mrs. Howard Deems
Mr. & Mrs. Burneil Gingery

August 3

P.M. Hostess: Mrs. U. E. Wendorff

1:30 Visit Golds Department Store

3:00 Coffee Hour and Fashion Show, Auditorium, Fifth Floor, Golds Department Store

Those ladies wishing to visit Golds will meet in the lobby of the Center at 1:15 p.m.

6:30 Banquet: Omaha Room, Nebraska Center for Continuing Education

Welcome

Merk Hobson, Vice-Chancellor & Dean of Faculties
University of Nebraska

On behalf of Chancellor Hardin and the faculty of the University of Nebraska it certainly is a pleasure for me to have the opportunity to welcome you to our campus. We consider ourselves quite fortunate in having a facility of this kind. Of course, facilities alone do not make a conference, but as I looked at your program and the participants in it, I know that you do have the fare-with-all to have an excellent meeting.

I think education and perhaps higher education in particular has been frequently criticized for their willingness to research everything under the sun and around it, but their own major activity, that of teaching and higher education. A conference of this kind hopefully will be an anecdote for this kind of criticism.

Certainly there are exciting things going on in all of education and in higher education. I think when you couple this with what a layman like myself might classify as a near revolution in agriculture, I think you people have lots to talk about. I think you have a challenge in terms of planning for the future for the many problems that obviously face both education and agriculture. We are delighted to have you here. We hope that your three-day stay is both pleasant and professionally profitable. Thank you.

Call to Conference

James T. Horner, Chairman
Department of Agricultural Education
University of Nebraska

Let me, on behalf of our staff add our welcome to each of you and assurance that we will do anything possible to make your stay at the University, Lincoln and Nebraska both pleasant and profitable. Also for our staff (and I'm sure for the group) our sincere appreciation for the time, effort, support and counsel of Dean Hobson, Dean Beggs and others who are always ready to assist us -- we appreciate it.

I would like to, while I have the opportunity, express my own appreciation to Prof. Alan Kahler, chairman of arrangements for the conference, for what, at times has been a discouraging task (with cancellations of speakers and participants because of the airline strikes). Al has put together and held together an excellent program of opportunities. We thank him -- but only YOU can make it an excellent conference!

Gentlemen, I agree with Dean Hobson completely. I sincerely believe that a new day is dawning for Agriculture and that a new era for Vocational Education and Vocational Agriculture and Research in Vocational Agriculture looms just over the horizon. We have chosen one of the oldest and most noble professions -- yet one with a bright and dynamic future!

Mr. Roger Babson, well known columnist-economist advises young folks to choose a basic and growing profession, something that is essential next year and the next. Certainly, we have done this as educators. The support comes from Washington on down. One of the recent statements of the President of the United States is that "the core of our hopes for a great society is education." It certainly is nothing new that people are the nation's greatest resource. They must have the benefits of favorable environment, including education, if they are to reach their highest potential. I note increased interest on the part of economists in studying the values of the contributions from the development of human knowledge. This seems to be a very promising area of research for economists.

One hundred years ago the establishment of land grant colleges illustrated the belief that the growth of the country would be stimulated through education. There is no doubt that the investment paid off handsomely in higher rates of growth of productivity in agriculture.

As far as educational growth is concerned, we find that in the past ten years the enrollment has increased by 50 percent. More than one in four people is now enrolled in school. There was 28 percent of our nation's population enrolled in school last year. The expenditures for educational purposes have increased 50 percent in the last 10 years, from 4 percent of our gross national product to a present 6 percent.

Certainly the vast expansion of federal legislation for vocational education with which you are familiar speaks for itself regarding the seriousness of our administration and the public to do something about the syncopated proportion of 80 percent of the people being trained for professions and college and 20 percent for work instead of the reverse as it should be.

Let us look now for a moment at the other part of agricultural education. Babson would surely list agriculture as the basic industry in all the world because agriculture's job is the production of food in a world in which the population is rapidly outgrowing the food supply. Although this may not seem serious here, it is a deadly serious matter in most of the world. Hungry people fight wars.

I visited recently with a professional man, a medical engineer from Beckman Instruments in Palo Alto, California, one who would not normally be considered a man to spend much time in thinking or studying and reading about matters agricultural. He broached the subject and said, "People are now getting concerned about the 'malthusian law' (i.e., the law where the population will surpass the food supply and starvation will result)." He pointed out that world leaders are now realizing the necessity for people to get along in a small world. He said we must teach and share or we will be forced to fight and share.

Quite recently an intelligent and wise professor of the liberal education type told me that we in agricultural education have too long tucked tail between legs, we've bowed and cowed and curtsied to the anthropologist and others who have within their mental structures the ability to think they are the greatest. Is it within us to realize our own worth? Is it within us to realize the value of our contribution? This professor's research was in medieval bone and pottery on the isle of Siam. Valuable as that is, I'm sure, to the contribution to the development of understanding of people and world problems, is it not much better to be able to say, "I am in agricultural education; a teacher in the food service area; to profess that I helped to feed a hungry American, I helped to fill the stomach of a hungry and angry Oriental or Asian. I help to prevent a war. I contributed significantly to world peace"?

Agricultural scientists have achieved hundreds of notable advances that pay great dividends to society and savings to consumers. It is pointed out that if the American farmer were using today the same techniques, tools, and information used at the end of World War II, we would be spending more for our consumer items, food and fiber, $13 billion per year more! These new discoveries would be to no avail at all without the dissemination of information at the application level; agricultural education.

It seems to me that a member of recent achievements have been particularly commendable in the area of vocational agriculture, but just how good and just what would be better we have not bothered to ascertain. Both increased quality and quantity of adult education programs in our area has been evident. Broader units, principles and management types of instruction have increased. We certainly have been more realistic in our supervised experience programs. We have been leaders in the area of leadership development and the problem approach to education. Better use is certainly being made of the technology in education. We are making better use of laymen and the local agencies and their contribution. There is certainly a looking ahead in the new areas of education in agriculture taking seriously the charge to prepare not only for production agriculture, but for the two or three times as many off-farm agricultural employee as well -- not only at the secondary but the post high school level.

There is among us a solid appreciation and willingness to participate in research in identifying better methods and techniques, but we still have a long way to go. We might reflect for a moment, in the first generation of vocational agriculture the real purpose and problem was to produce two blades of grass where there was once one. This was done without the necessity to research our efforts. The second generation, with the help of a war survived on the production agriculture program -- but no more! A new day has dawned. New social conditions, sociological pressures, and legislation has certainly provided the dollars to do the research they are demanding. The demand for researchers is great. A recent study involving thirty chief state school officers pointed out the need for 1,620 researchers in our field in the next three years. Twenty-nine of the thirty had already encountered some difficulty in hiring research personnel. It pointed out that the ratio of demand and supply is expected to be five to one for researchers in our area.

For nineteen years, I believe, leaders in agricultural education in the north central region, primarily state supervisors and teacher educators, have assembled themselves in an annual conference for the purpose of improving the research methods in our field -- mostly that of showing what is going on at other state universities. In planning for this conference (1966), there has been an all-out effort made to cater to the teacher-researcher in agriculture and other related areas, to the graduate student, as well as to the teacher education and consultative staff. We are attempting to increase the reservoir not only of quality but of quantity of researchers in our field. We are focusing this year on the ongoing agricultural education research in the region and attempting to suggest methodological improvements. We are attempting to identify new developments in agricultural education and ways of evaluating these procedures and methods. We will attempt to "stretch our brains" into areas of research with which most of us are unfamiliar; for instance the dissemination and adoption kinds of research. And, of course, we will consult with one another on common problems which will, when the solutions are identified, strengthen research in our area. Finally, we expect to work hard, but to gain much, both personally and professionally.

Research in Education

Walter K. Beggs
Dean, College of Education
University of Nebraska

When you're given a topic which is as broad as the one that we have here, quote "Research in Education," it is obviously impossible for an individual to cover it adequately. I am sure I could spend my time here, and I hope at some profit to you, in outlining a number of the specific types of research that need to be done in education. I think also that I might outline some research methodology that we could use, but I've chosen not to do that. The moment calls rather for a review of the background; particularly in your area of agricultural education.

Perhaps it is something of a coincidence that my father was the president of the board of education in Fort Morgan, Colorado, which established the first unit of agricultural education, or vocational agriculture as it was called that time, in the Fort Morgan city schools. Dad was a great believer in this movement and literally ram-rodded it through a board of education that was not especially interested in it.

I grew up on a sugar beet farm in Colorado. I guess I didn't know you could raise anything but sugar beets on a farm until I was eighteen years of age. I recall at that time that it was a hard, grueling, sometimes cruel, brutal life, because not as much was known then as is now about growing and harvesting sugar beets. And I guess the difference that is implied in that simple statement is the thing I want to talk about. Not so much was known then as is now. And certainly not so much was being applied of what was known at that time as it is being applied of what is known now. I think this could be a masthead, almost, for research in education. Let's explore this a little.

I remember in 1919 Dad had 100 acres of sugar beets. That year the conditions were just about right and he had a bumper crop. I think I recall this because it was one of the years of a very severe influenza epidemic in our section of the country and school was dismissed from the 1st of October and did not reconvene until after Christmas. Most of you here are not old enough to remember that hideous experience in American life just after World War I, but it was really a severe situation and officially all public gatherings were closed. That year it fell to my lot to be very closely involved in the harvesting of that 100 acres of sugar beets. I recall that we started about the middle of October and roughly 20 to 25 draft horses were required to pull the machinery and wagons. There were six of what we called beet loaders. We had a young army of pullers and toppers and I guess I accounted for something. I drove the four horse team on the beet digger. This machine dropped a set of fingers into the ground and loosened the beets. The pullers and toppers would then break the dirt off the beets and with a kind of machetti, cut off the tops. A loader would then come along and scoop the beets up on a wagon pulled by a four-horse team to the "beet dump." If you got there about 4:00 o'clock in the morning you dumped the first load off of the wagon directly into the freight cars. From then on you scooped them up onto what was called a silo. As I said earlier, we started in the middle of

October. I recall very clearly, we finished on Christmas Eve. This was two and one-half months of about as hard and grueling work that anyone would want to experience.

My mother is still alive and lives in the same community. A year ago last fall I went back out to visit. The train gets into Fort Morgan quite early and I knew that Mother wouldn't be up so I took a taxi out by the old farm. By coincidence I discovered that the farmer had 100 acres of beets in roughly the same spot that dad grew them 40 years ago or more. I saw him going into the field with a tractor and a machine and two wagons behind it. I discovered that this was a combination beet digger, topper, and loader. He could load both of those wagons without getting off his tractor and unhook them from the machine, then hook the tractor to the wagons and take them to the dump at some 20 or 30 miles an hour if he wanted to go that fast. He told me that with that machine he would harvest the 100 acres of beets in less than ten days.

Here, I think, is an illustration that typifies what research in agriculture and agricultural education has done in the practice of farming in the United States in one generation. We need to project our thinking into the broader-culture and have a look at what might be done in education generally to find ways to achieve similar results in many other areas. A number of things have jelled in the last year or two in the United States which very definitely demand the attention of educators.

I will name them in rather broad catagories. In the first place, the federal government, and as it has done in agriculture and agricultural education, has become a full partner in education generally in the United States. I do not mean just the contribution of money which is now at the rate of several billion dollars a year, but the federal government is getting into the policy making act too. The U. S. Office of Education has taken rather sharp exception to what it calls, or at least some of its advisors who are not officially members of the staff of the Office of Education call the "old establishment." They are evidently trying to inject some new vitamins into the educational blood stream. This may be a form of shock therapy, I don't know, but at the moment the government is taking the attitude that educational policy probably is going to require top level refinement if it meets the needs of the times. Probably a great deal of educational policy is going to have to be made at the central dynamo of American education; the Office of Education. I'm not taking issue with any of those points. I'm simply pointing them out to you.

The federal government is attempting a great deal of innovation. It is innovating in the field of educational structural design. We see the regional education laboratories coming into being. We here are a part of one that has started in Kansas City. It is supposed to be a new educational mix, an agency outside of the old establishment. Interestingly enough, it is, when you have a good close look at it, still the old establishment, but obstensibly outside of it. It is supposed to pull all of the educational resources within a region into this mix, achieve a new synthesis and redirect the resources back to the improvement of elementary and secondary education. The Office of Education is applying some of its resources directly to educational problems. For example, youngsters in depressed and underdeveloped areas who need special and remedial help are enrolled in what is called a "head start" program. Some sixteen departments or agencies of the federal bureaucracy are specifically engaged in one or more aspects of so called "improvement" in the educational enterprise.

Some new demographic patterns which are interesting and facinating are now appearing in the society. The Urban-agriculture ratio in our population has changed in the last 100 years from about 15% in the cities to 85% in the rural areas to almost the exact reverse. But it is the geographical dimensions of the megolopolis, or the urban complex that is of most significance. It is no longer a definable location in the sense that it is indegenous territory. It is becoming a linear or strip configuration. The best way that I can illustrate the phenomena is to call your attention to one such complex that is developing in this section of the country. If you will strike a line from Sioux City, Iowa, south through Omaha, St. Joseph, and Kansas City, Missouri, and then draw fingers out to Lincoln, and Topeka and over intc some of the Iowa communities, you can see the outlines of a great, heartland strip city that is emerging. For a time this was fascinating enough to study in itself as a sort of abstraction. However, we now have to begin to think in terms of what is involved culturalwise and in the management of the society which is well along toward organizing itself into some thirteen or at the most, twenty of these gigantic agglomerations of people. Within the broad framework of this structure are similar smaller configurations, each in its own way related to one of the larger structures. I would call your attention to the triangle that enclosed Kearney, Grand Island and Hastings which by the turn of the century will contain probably 250,000 to 300,000 people and will be a small strip city in its own right. I have not time for a lengthy elaboration nor you the patience to listen to the problems that are involved here. It is enough to point out that outside of these configurations are the broad geographic reaches of the United States devoted to agricultural industries which feed into the population strips their life blood, not only in food but serve also as the connecting avenues between them. On the other side of the chart, however, the population centers are a sort of suction pump that tends to drain the intermediate areas of their cultural and perhaps their economic resources.

You might want to think this over for a time and try to envision the galaxy of issues involved. Because, here is an educational challenge of tremendous proportions which will require just about all of the inventiveness we can develop. But this is only one of the demographic factors we have to consider.

The age distribution of this country is skewed in such a way as to be both exciting and frightening. By 1970, one-half of the population of the United States will be 25 years of age or less. By 1980, 60% of the population will be 25 years of age or less. To complicate the situation further, by 1980 approximately 17% of the people will be over 65 years of age. This leaves less than 25% of the population in the so-called "productive" years. This is the group that has all or most of the responsibility, which must do most of the work, which must do most of the planning and policy making. Unless we can find a way educationally to shift responsibility downward and produce maturity earlier we are going to have real trouble in finding the manpower to operate our cultural enterprise.

This society of ours has put a strain on our natural resources that could make us come unglued as a nation one of these days. I don't know whether you've been following the literature in this connection, although most of you are probably more acute observers of this phenomena than I. Even so, there is no escaping the seriousness of such problems as of just getting water to the places where we need it. We used to depend on nature to provide water "willy nilly" and when we were small and relatively unsophisticated this seemed to work all right. But we insist on building civilization in most unlikely places in the world. For some reason or other millions of people have decided they want to make their life and their fortune out in the desert country in Arizona and in parts of California and New Mexico. That is probably as near a waterless area as far as rainfall is concerned as there is in the world with exception possibly of the Sahara Desert. But the engineers are bringing water in. They have drained the rivers, they have captured all the rainfall available and they are diverting water from one region to another. A "king size" hassel is developing between the conservation people, and those who want more water--from anywhere it is available. This latter group wants to build two or three dams in the Colorado River for water storage. Some people say this will destroy the Grand Canyon. I guess all that it will do is fill part of it with water, but it destroys some scenic wonders and the habitat of certain exotic flora and fauna that probably should be preserved. Furthermore, even these dams would not provide nearly enough water for the growing needs of Arizona and the southwest generally. So what they are now attempting to do is to tap the basin of the Klamath River in Oregon, bring this water down through California, relieve the needs of the Los Angeles area and let Arizona have more of the water from the Colorado River and perhaps some of the Klamath basin water also. I don't understand all of the technical aspects of these things, but the maneuvering and the billions upon billions of dollars that are being spent to solve some of these problems, because of our demographic patterning in this country are amazing and certainly require attention.

Let's go to another problem which I'm sure that we will have to continue to discuss in more detail for many years. The inter-cultural, inter-racial harmony in the United States or disharmony I guess we would have to call it, is reaching the proportions of a major crisis and make no mistake about it. Again I do not want to take sides, I simply want to point out to you that the historical commitments to democratic ideals of this nation are bumping headlong into some tragic errors we have made in the past in implementing these commitments. I am obviously talking about our treatment of minority groups in general, and the Negro population in particular. It has implications in our educational system. It has implication in our system of economy. Unfortunately, the historical bitterness that has developed on both sides of this issue makes rational corrective measures most difficult.

Finally, the factor that perhaps is basic to all of the others, and which may be the controlling element in all of our problems, is the rapid development of the computerized technology in our industrial community and the society generally. The "wedding" of the computer and the automated machine, the rapidity of communication and transportation, the storing and retrieval of information, and the fantastic rate of discovery and refinement of new knowledge -- are posing a dimension of societal development which is new, and most difficult to understand -- much less to control.

Now if it were possible to strip the surface veneer off of our cultural organism and have a crucial look at the raw machinery beneath it, we would find some great festering sores which could destroy us unless a healing balm can be found for them. I say this deliberately, because I think we are mature enough and grown up enough in this nation to look at these things rationally. Please don't misunderstand. I'm not saying that we are deteriorating as a culture -- that the nation is sick beyond repair. On the contrary, because the culture is basically healthy and the blood stream of these United States is so vigorous that we have been able to live with these sores. But some of them are beginning to show signs of malignancy and they require attention.

Without going into further detail let me point out something else about us in the United States. We have always had a palative for all of our problems from the very beginning of our history. We have always maintained when something has gone wrong, if we educate more people we can solve the problems. We will up grade our educational system and somehow, via this method we will find the answers. This is all well and good, and we have developed an acceptable system for the most part. But some of the current sores of our society are right within the education system itself. Not the least of these is the tendency to take the generalized, scatter gun approach. Somehow we have always assumed that if we educate enough people, if we make enough people better, somehow they will plow their wisdom back into the society and eventually we will find a specific that will arrest, if not heal the faster. This may have worked in the past, although how well it has worked is perhaps subject to question. But it will not suffice for the future. We cannot hope to solve race problems, learn to live with computers, manage strip cities, or adjust society to a population that is growing younger each year by using the shotgun approach in education. We cannot meet the needs of underprivileged youth by teaching them middle-class values at a vocabulary level for which they have neither apperception nor appreciation.

It is not to our credit, educationally, in the United States that between the first grade and the sophomore year of college, over 75% of all that start have dropped out, and less than 15% ever graduate from college. We assume, of course, that as much education as possible is good, both for the individual and for society. If this assumption is correct, then the dropout rate is a national calamity, and we are paying a high price for it. The federal government is now beginning to take remedial measures in such programs as, "Head Start," the "Job Corps" and a number of other ventures, but so far these are only a token beginning.

Another sector of the population which requires attention is the over 65 age group. This group numbers over 20,000,000 now and will grow rapidly in numbers. Many of these people are still alert, productive, and together represent a resource of experience and know how that should be used. But how to use them, how to keep them from being a drain on society rather than the fine asset they could be is an educational problem of major dimensions.

So what is involved? What do we need to do? Here I think is where we can make our great research contribution in education. Our educational needs point to specialized needs and require a specialized approach to meet the need. Putting it crudely, and in an over-simplified statement -- we must find a way to "pin point" our educational efforts toward specific problems. All teaching must be carefully designed; as to purpose, as to technique and methodology; to meet a given need. This in effect is what has happened in agriculture in the United States in the last fifty years and you have seen the excellent results. When the people in your field began to look at the problems of agriculture they went to the farms and tackled the problems at their source. They picked out specific needs. They said we've got to produce a wheat that is drought resistant, we need hybrid varieties, we need specialized machinery, we need specialized methods and approaches.

If we can translate this whole concept to the larger national scene we will, I am sure, be able to solve our problems. When we admit that we need an elderly person who maintains his self respect and still can contribute to his society, when we admit that we must direct teaching to the specific needs of an individual, or of certain types of individuals, when we admit that the "scatter gun" approach will no longer work -- then we are ready to research the problems that are involved.

Specifically, how do you set up an educational need pattern and teach into it. For example, consider the youngster who has a completely different set of values from that of the so called

middle class. He sees no value in mastering the discipline of the liberal arts, but the discipline of the ghetto appeals to him, along with its peculiar system of values. What kind of an educational program can be designed to meet this specific need. Your imagination can take you from this point on, but here is the great area of educational need, for expert research. Here is where we win or lose the battle.

At the University of Nebraska we propose to at least make a beginning. The concept of "design for teaching" to meet a specific need, will be central to the whole program in teacher education. We propose to create a center for teaching design. The facility will contain four components. First will be a materials development center where any aid, device, technique, or material need to achieve a given end will be available, or can be produced. Second, an electric teaching complex will be established with at least 160 student stations and probably as many as 250 which will be integrated into a central control in such a way that each station can be used by an individual student or any combination up to a total number of stations. Third, a library component will be provided which will be traditional in one way, but which will have all kinds of tapes, films, etc. which can be used in designing a specific teaching and learning environment. Finally, we hope to develop a system of information retrieval which will tie us in with the rapidly developing research resource centers not only in the United States, but over the world which can contribute to the design effort. What we hope to produce is a generation of teachers who are conditioned basically to consider the needs of the learner and to teach directly to them with a scientifically designed approach. I have given you

the framework of what we propose to do. I have not mentioned the headaches, frustrations and pitfalls that lie between the concept and the refined execution of the idea. But, this is the habitat of research in education.

THE CHALLENGE TO SOCIAL SCIENCE RESEARCH IN AGRICULTURE

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Despite an undergraduate major in agricultural education, and two years teaching vocational agriculture in Minnesota, I find my assigned role this afternoon somewhat akin to that of Rip Van Winkle as he came out after his twenty years of slumber. I am quite conscious of the fact that things have changed in agricultural education, but am not completely able to explain the precise nature of these changes nor why they have come about. I'm cast into the role of an observer, of an outsider, hopefully of a constructive critic, trying to take specific measure of your research, but feeling somewhat inadequate for the job. Hopefully all of my comments will not miss the mark completely through ignorance, but I'm sure that some of the things I shall say will do so.

Social science research has moved on. We in the social sciences may sometimes feel, as I am sure that all research people do, that we aren't making sufficient progress; but if one casts his eye around, and takes stock, he will appreciate the fact that we have seen measurable progress in the social sciences. Some of the accomplishments are quite impressive. To illustrate let us note several examples from the social science fields; I shall draw more heavily on the field of economics, with which I am more familiar, without attempting to imply that the record is more noteworthy there than in any other social science field.

The Keynesian breakthrough in econimics is familiar even to many laymen. John Maynard Keynes, the British economist, identified the relations between spending, employment, income, consumption, and saving in the aggregate economy,and went on to posit the nature of the multiplier effects which are associated with fiscal and monetary policies. His "new conomics" have been translated into action. The cutting of the income tax rate in 1963 followed the Keynesian model; the effects of this action seem to have substantiated the Keynesian hypothesis. Interestingly, the outcomes were predicted at that time by economists with a fair degree of accuracy. Of course the issue was debated vigorously at that time, and the arguments sometimes took on ideological characteristics. The predicted outcome of this experiment was that if we cut the income tax rate,economic activity would be stimulated and that the income tax take of the federal government would be greater rather than less. This effect apparently took place, the tax revenues of the federal government rose, and we came closer to a balanced budget. Of course, the Vietnam conflict has introduced new variables into both the private economy and government budgeting.

In summary the use of the Keynesian model represents a breakthrough for the social science area. Keynes notions have been tested not only in the United States, but in the experience of countries like Great Britian, France, Sweden, and Holland.

The Malthusean doctrine is residue from the distant past. Malthus was actually a minister of the gospel; however, his interests carried him into sociology, economics, and population dynamics. He formulated the relationship between population and food supply. This formulation was looked at with alarm at that time, and more recently with amusement, but has been restructured by Rostow, and is known today in part of the intent of Rostow's stages of economic growth.

Rostow's hypotheses have been studied by developing countries around the world. The attention given to the Rostow concept illustrates the power which can be possessed by an idea,in this case originating from the thoughts of two men separated by a century of time.

Toynbus' application of comparative analysis in the field of history is found in his book, "The Study of History", in which he analyzes the rise and fall of nations. His work represents a benchmark in historical analysis and can certainly be regarded as a breakthrough in the social science area in a field of study which inherently does not offer the possibility of dramatic achievements from either the statistical or the theoretical standpoints. History is looked at as an empirical field characterized by inductive rather than deductive analysis.

Margaret Mead's demonstration that the problems of adolescence were cultural rather than physiological in origin has been a powerful idea which has certainly affected the work in anthropology and social work.

Political scientists have been interested in agricultural organization and policy, and have given us insights into the failures and successes of the governmental programs in agriculture which have been in operation in the United States since the 1930's. Relying on the basic concepts of the theory of political thought, for analytical tools, they have given us observations which make it possible these days to avoid some of the pitfalls which early programs fell into when applied to agriculture.

In the field of agricultural economics, the relationship between agricultural adjustment and national economic development and the economic variables underlying the so-called farm problem hav been worked on by a large number of people. I think that we have seen the evolution of a body of thought, a collection of concepts, which today represents insights and analytical power which we did not have twenty years ago in terms of our understanding of the aggregate aspects of the agricultural economy.

Opinion testing is a relatively new development since World War II. It came into its own after World War II and has become very popular and are widely quoted. It represents another significance of social science breakthrough. The statistical techniques, which have been applied have become more and more sophisticated, contrary to some of the criticisms leveled at them during close elections.

Demand analysis and the analysis of supply response in agriculture have shown great progress since World War II. Our knowledge of specific demand relations and of specific demand funtions of agricultural products, certainly is more sophisticated today. This kind of knowledge is extremely important when we talk about agricultural policy and agricultural problems. As a result of this increased kn ledge , agricultural policies can be much more precise than they were in the 1930's in terms of predicting the outcomes and consequences of specific measures, as for example, the feed grain program.

These examples are evidence for suggesting that we have progressed in the social sciences. You could name others, of course. My examples were simply meant to stimulate your imagination.

I would like next to devote some attention to the intent of the social sciences. My discussion may vaguely begin to resemble a first course in research methodology, but once in a while we do find ourselves puzzled in attempting to define the social sciences. Jim Horner and I had a discussion several years ago about agricultural education and how it fit into the social sciences. Our exchange then stimulated me to put this topic into my comments today. What are the social sciences? Basically, the social sciences involve the study of the group life of man, the study of the elements of culture which determines the basic patterns of human behavior. In my own thinking, I distinguish between what I call the basic social sciences and the applied social sciences. The fields of history, anthropology, economics, political science, sociology, and psychology are the sources of the broad theoretical conceptual insights about the relations between man and their environments. I would contrast them to the applied social sciences including rural sociology, social work, agricultural economics, and agricultural education which are in a sense the generic creatures of one or more of these parent disciplines. They are synthesis fields in a sense. For example, in agricultural economics, we've had a lot of debate over the years as to just what is an agricultural economist; the implication of the debate really pertain to what intellectural qualifications make for effective research in agricultural economics. We have come around to the idea that an agricultural economist is first of all an economist, and second, he is a man that has an interest in agricultural problems. In the same way, a rural sociologist is first of all a sociologist and second a man with a specific rural interest. Following the same approach, agricultural education seems to me an outsider to be a synthesis field that is related generically to several of the basic social science fields, including psychology,

sociology, economics, political science. Even business adminstration creeps in when we identify issues of education administration.

I would now like to turn to some pitfalls in the social sciences. It seems to me that there are some snares, some pitfalls, which uniquely characterize social sciences, compared to the biological or physical sciences.

First, because they are new and immature and because they lack the prestige of the physical and biological sciences, the social sciences often show excessive caution and hesitancy. I don't think the social sciences are commonly characterized by an excess of confidence; more often the case they are characterized by reluctance, a tendency to hide conclusions behind verbage and a tendency to qualify findings with an excessive number of conditions.

A second pitfall , the lack of understanding of the social sciences by lay persons or adminstrators, sometimes causes the social scientist to be encouraged to solve impossible problems. I characterize this as the tendency to wish "to solve the world." Too much social science research effort suffers from the formulation of topics in excessively broad terms, and its attempts to identify and quantify too many variables in a single , modestly financial study.

Another pitfall of the social sciences is the tendency of laymen to expect social scientists to justify their particular vested interest. Economists have been faced with this problem, more often in the past. A farm organization, or a commodity group, with a particular ax to grind, a rather particular policy line, sometimes expects an economist to be able and willing to justify the specific line being taken.

The tendency to develop unique vocabulary unintelligible to laymen and other social scientists alike, and to view it as evidence of scientific method is another interesting phenomenon. I think that some sociologists fall into this trap. At least they are sometimes difficult to understand. I am sure that economists can be accused of the same thing.

The tendency to couch research problems too broadly, to spend less time than necessary defining specific problems for research, and in devising hypotheses, and to rush out with a bushel basket to haul in data whether relevant or not is another pitfall of the social sciences.

Finally, a fundamental pitfall is the fact that the social scientist is a part of the universe he is investigating and his investigation process may actually change the problem situation in which he is working. For example, once a man has answered a questionnaire, he may not be the same man anymore. His views may have been altered by the questioning process.

With these introductory remarks, I would next like to move more directly to agricultural education, in what I have labeled in my notes as a "self analysis of agricultural education research." Here I fear that I may say things that will really miss the mark, but shall be fearless by virtue of my ignorance and proceed anyway. I hope that I can stimulate your thinking by asking a series of questions relating particularly to research in the field.

What theoretical training is utilized in graduate degrees in agricultural education? I suspect that in agricultural education, as has been true in agricultural economics and rural sociology, there must certainly have been controversy about the role of theory in graduate training. Theory is not like castor oil, something that is just good for one to be taken with the idea of getting it over with, in order to experience the presumed therapeutic effects that might be associated with it. Instead, theory is the collection of concepts, of logical relations, which comprise the broad generalizations about what is known in a field. There is a relationship between theory and research hypotheses, with hypotheses being the tentative notions which we adopt provisionally in a particular research activity. Theory does provide guides, anchoring places, for a person who is constructing the hypotheses which he intends to apply in a particular research project. I have had the impression, rightly or wrongly, that many agricultural education graduate students in the past have not really gotten in their training, a concept of the role of theory in research. If true, one reason may be the fact that agricultural education research obviously derives its theoretical bases from a variety of sources. The graduate student has to decide on the area in which he will develop his theoretical roots, whether it be psychology, sociology, economics, etc. A sampling of courses from a variety of fields does not give one the command of the theoretical tools necessary to proceed with effective research activity.

Another question I would raise in this self analysis concerns the amount of contact which people in agricultural education have with the parent conceptual fields? For example, how much exposure do you have to psychology, which must be important as far as learning skills are concerned, or be important in the field of human relations in the seeding of occupational placement.

What competence do people looking toward agricultural education research develop in mathematics and statistics? These disciplines are not status symbols, nor ends in themselves, but they do give control over the analysis which is being carried on and increase its power. They make it possible to increase the efficiency of sample design, to increase the precision and objectivity of inferences that are drawn in a research study. A simple count rarely yields significant truths in research these days for the reason that the easy research jobs have already been done. We are now proceeding to tackle the more complex research jobs in which we have to design greater control over what we do analytically than has been the case in the past.

How effective is the general research methodology which is used in agricultural education research? I'm sure that we could criticize all of the social science fields in one way or the other for the particular idiosyncracies we find in their research methodologies. I have the impression that considerable work in the past in agricultural education has involved the bushel basket approach, namely, that of gathering a bushel of interesting facts, bringing them back to the office and then trying to figure out what they mean. This approach also might be called the scatter gun method. It involves excessive foot work and insufficient brain work. An alternative approach does insure the possibility of more conclusive research results, and involves a combination of deductive kinds of activity and the inductive work of collecting data and analyzing it.

What do we mean by deductive stages in research? The deductive approach includes several ingredients. First is the definition of a problem in specific terms. What is the problem that is bothering us, the problem we are going out to solve? I'm often impressed with the tendency of people to rush out and collect data without really knowing what they have in mind in terms of the specific problem they intend to analyze.

A second stage in the deductive process is the design of an operational hypothesis or, in other words, the model to be tested. This is probably the hardest part of the whole research process. The real intellectual power which will be ultimately demonstrated in a piece of research will have its origin in this stage. What are the operational hypotheses? The operational hypotheses include those relations between variables which we set up tentatively, which we are adopting as suppositions by which to explain the phenomena involved in our problem. The hypotheses guide the investigator in the search for facts; they indicate the kinds of analysis to be carried out and suggest in advance the nature of the conclusions which will be drawn at the end of the study. Sometimes people say, "let the facts speak for themselves." But what facts and data are to be collected, what facts are going to speak?

Following the design of operational hypotheses, the next obvious step is that of statistical design. This step is really less important and more mechanical than the preceding ones, having to do with the specific kinds of data to be collected, how they will be collected, which data will be sampled, and how they will be analyzed.

These then, are the steps in the deductive stage, in the bushel basket approach they are often overlooked as the researcher hastens to the next broad part of the research project, namely, the inductive fact gathering and analysis stage.

Let us proceed with our self analysis. What is our creativity index? A number of sub-questions might be asked here. What questions of a controversial nature do you talk about? What controversial questions do you discuss? What issues do your graduate students argue about? Tomorrow's research is reflected in today's arguments. Are your research projects stimulated by what's fashionable in the profession, by what other people are working on, or are they the result of your own reflective thought? What new ideas of interest to your colleagues have you generated in the past year?

A more mechanical question, one which is self evident, concerns the amount of physical energy devoted to research. Are your staff members competing to produce and publish? Research is something that can be put off until all other work is done, which means that a person may never get to research, or on the other hand it can use a person's best time. I once was impressed with a friend of mine, a minister, who loved to write and who did write considerably. This fellow was a very busy pastor of a large church. One might have supposed this man, if anyone, would have difficulty finding time to put his thought down in the organized fashion necessary in writing a book. This man wasn't an author. I once asked him for his secret. He replied that he tried to do his writing during the first two hours of the day. He was taking his best time for this activity.

What attitudes toward research are developed in your graduate program? Do you have seminars in which graduate students discuss research topics? Is the masters thesis a minimum task which is necessary in meeting the requirements for the degree, or is it a genuine piece of research based on the knowledge of the literature and the methodology appropriate to the problem which is outlined.

Finally, the last topic in my notes is simply entitled "Challenges". I have tried to look in from outside the field of agricultural education research and to ask myself what problems I could identify in your field which might particularly challenge you during the next few years. The result was a rather broad range of topics, which I will review in somewhat cafeteria fashion in an attempt to stimulate your thinking.

It seems to me that we are too ignorant concerning the leadership process in community planning, and the education process in leadership development. Many people are concerned with the development of leadership in rural communities. Certainly the roots of this topic originate in the fields of communications and psychology.

A fairly obvious topic, and one which, like sin, will always be with us, is that of alternative methods of teaching. An associated topic, and one which I picked up in several places in your literature concerns alternative methods of organizing vocational education. An example is the controversy in agricultural education concerning the area school versus the high school. Are the arguments of today on this issue based on adequate investigation.

Another topic which is abstract and theoretical in nature concerns the philosophic objectives of vocational education. What are the present day objectives of the field? What human products do we visualize from the field of vocational education.

The topic of "alternative curricula" has challenging implications. I looked at the Janesville, Wisconsin study by Hensel and Becker and I was impressed with the idea that experimental work can be carried on in which alternative kinds of curricula may be tested.

The correct mix of vocational education and general education, in the training of vocational education students is an unanswered question, particularly in view of the rapidly changing technologies of today's society, the rapidly changing job descriptions, and the emergence of new jobs.

A topic that is very close to agricultural economics and certainly has one foot in agricultural education might be the methods of management training in agriculture or the methods for teaching decision making in farming.

What is quality in vocational education? How do you measure quality? What is the meaning of quality?

Who should take vocational education? What are the relevant criteria in the selection of vocational students?

What of the training of vocational education teachers? I had the impression when I was an undergraduate in agricultural education that somehow the course of study I was following had been handed down from Mt. Sinai. Further investigation revealed that Mt. Sinai was the U.S. Office of Education. Is there a possibility of expermenting with alternative kinds of curricula for agricultural education students? Could we send teachers out with greatly different kinds of training and see how they perform? I realize the problems of measurement involved, but could we not experiment?

Alternative communications systems for transmitting agricultural knowledge represents a very large, fertile field which involves not only agricultural education but agricultural extension. With our changing rural society, with the emergence of commercial sources of information, the whole field of communications systems seems to be in a dynamic state. Some terribly important decisions are implied in this topic.

What of the learning process in vocational education? Do we know enough about how people learn, and the effectiveness of alternative ways of acquiring vocational knowledge?

Another interesting question concerns the relative effectiveness of specific educational organisms, and approaches in agriculture. For example, do we have an objective appraisal of the 4-H approach in accomplishing educational objectives?

I have appreciated your tolerance and patience in listening to the ideas of a not unsympathetic wayward son, who has returned after a lapse of 20 years.

Research Design

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The content of this paper is not original. Most of it is based on material in the Campbell and Stanley chapter of the Handbook of Research in Teaching.[1] I hope you all have copies of this book in your library. For me, the Campbell and Stanley chapter alone has been worth the price of the book.

In the field of education, validity is a pervading concept and validity is certainly a crucial concept for the researcher in education. In this paper, I should like to discuss the relationships between validity and research design.

Before going further I should define how I use the term research. My use of the term is consistent with how it is defined in most methods of research textbooks, i.e., a systematic attempt to determine the relationship between or among variables. This is a more restricted definition than is often used by educators. In fact, in my research methods class I discuss the basic-applied continuum of research as developed by Clark, Hilgard, and Humphries.[2] The common misconception of this continuum in the class is that only research toward the basic end of the continuum is concerned with hypothesis testing and the applied research is concerned with implementing the results with no further hypothesis testing. I submit that this is an incorrect interpretation of the continuum. As I interpret the continuum, at any point one's research effort is directed at tests of hypotheses; the differentiation results from the setting in which the data are gathered and the materials used.

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[1] P. T. Campbell and J. C. Stanley, "Experimental and Quasi-Experimental Designs for Research in Teaching" in N.L. Gage (Ed). Handbook of Research in Teaching, Rand, McNally and Co., Chicago, 1963

[2] Continuum is presented in Gage's chapter on "Paradigms for Research" in the Handbook.

Two other continuums can be thought of as running parallel to the basic-applied continuum. One is a continuum of internal validity and the other is of external validity. Internal validity applies to the research situation itself and is concerned with the question of whether the experimental treatments or the independent variables did in fact affect the results. Generally internal validity is high at the basic end of the continuum and decreases as one moves toward the applied end of the continuum. External validity refers to the question of generalizability, i.e., can the observed effect be generalized beyond the research situation. Some would argue that external validity is impossible, but a researcher could hardly be expected to be this conservative in his interpretations. On the basic-applied continuum, external validity is low at the basic end but increases somewhat toward the applied end although it will not be very high at the applied end unless internal validity at the applied end can be quite well established.

The last sentence above leads into the point of this presentation. It seems to me that internal validity is dependent to a great extent on design and not on whether the research is "basic" or "applied". Thus basic research generally has a higher degree of internal validity than applied research because those in basic research are more likely to use a true experimental design than those in applied research. This is not an implication that they are "better" researchers, rather that the laboratory situation of the basic researcher allows him to employ true experimental designs more readily than can be done in many applied situations.

I would suggest that we are in a position now to apply true experimental designs to many of our problems and thus increase the internal validity of our research. Campbell and Stanley suggest three true experimental designs, but I will use only the simplest one for this discussion: the postest-only control group design.

R X O

R O

In this design the subjects are assigned at random to the treatment and the treatment is administered concurrently or randomly. Now we all recognize the problems inherent in applying this design to educational situations. We can't always assign pupils at random to classrooms, and even if we can it is often physically impossible to administer the treatments concurrently. This design is not impossible, however, in a classroom situation. Page[3] employed this design in a study of teacher comments and student performance, and I have a student who is using such a design in a study of pretest sensitivity. If the treatments can be administered simultaneously in the classroom then the design can be used with individual students as the sampling units.

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[3] Page, E. B. "Teacher comments and student performance: A seventy-four classroom experiment in school motivation." J. Educ. Psychol., 1958, 49:173-181.

Further, if we define our sampling units appropriately, a true experimental design can be used for those situations that make its use impractical in the classroom. We now have the resources available so that we can think realistically about using classrooms, schools, or other administrative units as our sampling units and assigning our treatments randomly to these units instead of the individual student. In such a situation our raw datum will likely be a measure of central tendency or variability derived from the scores within the unit.

You may protest that one will measure 30 or 50 or 100 subjects for every data point used in the study and that you are losing a large number of degrees of freedom for your statistical test. On the other hand, have you gained more than or as much as you have lost. You have gained greatly in your confidence that any difference is attributable to your independent variable or variables, that is, in internal validity; you have gained in precision of measurement in that each data point is considerably more stable than individual scores, and you have gained in external validity by using a broader sample and thus one that is more likely to be representative of a population of schools. Keep in mind also that there is nothing sacred about the .05 level of confidence. Why not use the .10 level if the loss of degrees of freedom is disturbing?

I recognize that this design is not feasible for all situations, especially descriptive type studies in which variables can not be manipulated. It does seem reasonable, however, to suggest the design as an ideal and that we can attempt to approximate and even achieve it more often than we do. The Campbell and Stanley chapter is an excellent source for quasi-experimental designs that approximate the true experimental design.

Many other problems or issues might have been presented in connection with the design topic. I chose this as one that I felt might be covered in the time allotted.

In closing I want to repeat and emphasize the main point of my argument. Internal validity of applied research can be increased with proper attention to design, especially the sampling unit, and that this will also increase the external validity. Further, the resources that are now available enable us to think realistically about designs that are actually or closely approximate true experimental designs.

A Practical Approach to Disseminating The Findings of Educational Research

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A Practical View of Dissemination

The immensity and complexity of research in its many manifestations create more problems than research alone is able to solve. In a sense, it might be said that research operates according to Parkinson's Law -- where money and people are available, research problems will be created to utilize them. Ultimately, this is good. However, as in many other areas, the ultimate is seldom reached because of the complications of the intermediate. An infinite amount of research is conducted, an infinite amount of results generated. Problems arise. How is this information to be used? How can it be made available to those who might use it? In other words, how is it to be disseminated?

The term "research" as used here refers to research in the multiple areas which make up the field of education -- vocational, agricultural, or academic. Since our primary concern is with education, and since the demands of education tend to be different from the demands of, let us say, farming, it would be foolish to attempt to discuss "research" generally, without limiting the range.

The semantic jungle surrounding the field of educational research makes it desirable to further define our terms:

diffusion "...the spread of a new idea from its source of invention or creation to its ultimate users or adopters." Rogers (6)

adoption the acceptance and subsequent utilization of an innovation by a professional or lay person.

innovation A development, method, or idea, novel to the situation into which it is introduced. The term is used to include research results and information.

dissemination receiving and channelling, essentially rediffusion of research findings in order to make them available to the public (professionals and lay citizens)

This brief glossary is necessary to meaningful reading of this presentation since the terms used are open to wide interpretations, and must be read in their present context.

Our title is "A Practical View of Dissemination." Hopefully, we have established a workable terminology, and can concentrate on our view of dissemination of research.

Katz, Levin and Hamilton (3) outline seven points for diffusion research. They define diffusion research (interpreted as diffusion of research) as, "(1) acceptance (2) over time (3) of some specific items, idea or practice (4) by individuals, groups, or other adopting units, linked (5) to specific channels of communication, (6) to a social structure, (7) and a given system of values or culture." In this chain of diffusion, point number five, "specific channels of communication," is of particular interest. This, we feel, is dissemination.

The glossary of terms defines dissemination as re-diffusion. Diffusion is defined as the process by which innovations spread from their source to their adopters. In this seemingly clearcut process, problems appear. How do innovations spread from the innovator to the adopter? What avenues do they use? How does the adopter become aware of the innovations? Here, dissemination enters the picture. We see dissemination as an intermediate but vital step between diffusion and adoption. Information leaves its source, travels to the dissemination point (diffusion), is channelled, and distributed to the ultimate users, the adopters (re-diffusion or dissemination). Elimination of the middle man (the dissemination center) would perhaps simplify the process but would definitely render it less effective.

There is a cyclical aspect to dissemination. In many cases, the adopters become themselves innovators, and in turn contribute findings or innovations which must be disseminated to their adopters.

An analogy seems indicated here, and several possibilities occur. A purely visual, but strangely appropriate, one is that of a river system, with tributaries, a main stream, an eventual destination, and, along the way, evaporation, which returns to the system as rainfall. The tributaries are the innovators, the mainstream the dissemination center, the ocean the adopters, and the evaporation the generation of new research whose results are fed back into the sources and dissemination stream. Thus, dissemination is a part of the process of diffusion. The dissemination center is virtually a clearing house of research results and innovations, taking the responsibility for bringing together the users of information with the information to be used.

Dissemination, then, is a service, a utility to expedite the process of diffusion. Innovations are collected, analyzed, organized and distributed to those who can use them.

We have discussed dissemination on a theoretical level. This is a practical view, and the practical question arises--who does the disseminating? We have two answers: the Research Coordinating Unit and the Mid-Continent Regional Educational Laboratory. The first of these agencies, the Research Coordinating Unit, will serve as a model, with the feeling that the description may be applied to the Mid-Continent Regional Educational Laboratory.

Brickell (1) lists three major steps in dissemination: informing, convincing, and teaching. These steps cover the principal functions of a disseminating agency. The responsibilities of the Research Coordinating Unit are outlined below:

1. Communication Two-way channels of communication with producers of research and consumers (innovators and opters) must be opened and kept open by a constant interchange of ideas and information.

2. Organization Once the material has been collected, a system of analyzing, recording and cataloguing must be developed. Without organization, i.e., systematic knowledge of the available materials, dissemination is impossible.

3. Merchandising This function is usually described by the dual terms demonstration and re-education. The strongly commercial overtones of our term may be distasteful. Nonetheless, this is essentially what must be done. Some form of advertising is desirable, although, of course, it is not suggested, appearances to the contrary, that we praise the qualities of our wares and their superiority over all others. Research findings are not potato chips. We must, however, make the public aware of their existence and possible usefulness.

4. Distribution The information must be put into a usable form, and distributed to the users. Perhaps the commercial image is again the most appropriate, and we might call this packaging

the product, with emphasis on utility rather than visual attractiveness.

5. Development Here, we break the chain of diffusion and dissemination, and discuss an important collateral function of the Research Coordinating Unit. One of the major jobs of the Unit is to assist in the development of research, through its knowledge of the subject, and through its resources. This is a complex function, involving knowledge of material, selectivity, knowledge of design, and creativity. It is not a function of the Research Coordinating Unit to initiate research. It is, however, a function of the Unit to assist in the design and development of research when asked to do so. It is therefore essential that the Unit make this aspect of its operations known and easily available.

The outline of the functions of the Research Coordinating Unit is skeletal. Each function can be elaborated at length. The team aspect of the work of the Research Coordinating Unit cannot be overemphasized. The personnel of the Unit do independent jobs, but they do them with a mutual purpose. Thus, hopefully, harmony is established, a quality necessary to effective performance from the Unit.

Our practical view of dissemination must take us from consideration of the functions and possibilities of a disseminating agency to a discussion of its ever-present problems. The problems facing disseminators stem from three sources: the innovators, the disseminator, and the adopters.

1. Problems Caused by Innovators This group includes those deficiencies present in the research itself, whether in the content of the subject matter, or the failure of the research to achieve his objectives.

a. Failure of research to address itself to timely questions. Guba (2) cites the pressure for originality in research as a barrier to effectiveness. He states that suggesting a need for research in a certain area or on a particular problem virtually precludes its being studied, since researchers tend to feel that a suggested topic is not original. Whether or not this is a valid assessment, it is true that some areas remain unstudied, and that others require more study. It is also true that certain often-cited and ratherly elderly studies might profit from repetition, utilizing up-to-date methods of data processing. Naturally, dissemination of innovations is made more difficult by a shortage of usable innovations.

b. Ambiguity of research findings
Here there is a basic conflict between the research (innovator) and the practitioner (adopter). Because of the variety of studies and results in any given area, the practioner, according to Guba, is likely to feel that "you can prove anything with research," and to discount the value of research generally. Since it is the function of dissemination to make research findings available to practitioners, this presents a problem to disseminators.

c. Lack of contact between pure and applied research. The traditional gulf between the pure "ivory tower" scientist and the applied scientist is a barrier to effective research in education. Dissemination must find a way to provide a bridge for this gulf, and to make the findings of pure research available to solve practical problems.

2. Problems Caused by Disseminators The problems in the dissemination process can be combined under one all-embracing heading -- lack of workable organization. Many dissemination agencies simply have not established a workable framework in which to carry out their functions. The immensity of their task makes organization imperative. Organization problems include problems of adequate and competent personnel, public relations and efficient methods.

3. Problems Encountered in Adopters

a. Reluctance to disturb the status quo. Basically, human beings do not like change, even when they know that it is good for them. This is especially true of the complex organizations, such as school systems, which might reasonably be expected to be receptive to innovations. Meierhenry (5) states that change will not occur unless there is an imbalance within the system, and that such an imbalance is discouraged by the conservative administration. It is also true that individuals, whether teachers or lay persons, resist that which might cause them to change their methods or thinking. The solution seems to lie in the re-education aspect of dissemination.

b. Existing organization of receiving agencies. Meierhenry mentions three aspects of this problem:

1. The pluralistic nature of school systems--the macrocosm-microcosm organization of the typical school system presents problems of communication. Not only is it necessary to contact the school system itself, but to work with each of the myriad individual units which make up the system.

2. The complexity of the decision-making structure--

Decisions are made on several levels, and each level includes several individuals with equal authority.

3. The lack of linkage among departments and levels in educational structures -- this is a corollary of Meierhenry's previous two points.

Perhaps the answer to dealing with the diversity and confusion of many of the potential adopting agencies lies in adapting the dissemination organization to the organization of the receiving agency. This would involve making a study of each of the possible adopters and attempting to reach the various levels and departments. Analyzing the market is a basic strategy of advertising; research dissemination is essentially a form of merchandising and advertising.

c. Lack of time, resources and competence

A major difficulty in adoption of research is the lack of preparation of the adopting agencies. They are simply not equipped to receive and utilize innovations. The load of duties and responsibilities, shortage of adequately trained staff, and lack of resources are discouraging to both the disseminator and the adopter.

This is a brief, simple discussion of a broad, highly complex area. No hierarchy of problems has been attempted. Although the same problems exist for most disseminating agencies, the degree varies as does the order in which the problems are encountered. Solutions to the problems are often inherent in the problems. Implementation of the solutions lies with the disseminator. Only general solutions are outlined here. It is felt that the individual disseminator knows his limitations, understands the particular problems facing him, and is the only person able to evaluate appropriate solutions.

Our practical view of dissemination might be summarized:

1. Dissemination is not an intellectual concept. It is a service, a necessary step between the generation of research results (innovations) and their adoption.
2. Dissemination can be successful only when the disseminator understands his function - neither creator nor adopter, but intermediary.
3. Dissemination faces many obstacles, most of which must be overcome by the individual disseminating agency.
4. Above all, dissemination must be a flexible process, operating within a strong but loose framework, and prepared to accept changes, and, where necessary, to initiate them.

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A PROGRAM PLANNER LOOKS AT ADOPTION RESEARCH

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ADOPTION

Our attention thus far has been directed toward research design, the development of research projects and the practical view of dissemination. I would like now to direct the discussion to the role of adoption research in agricultural education. First I will review some of the major adoption research literature. Second I would like to suggest how research results might be of value to the practitioner in the field of agricultural education.

Some 600 studies of adoption research have been cataloged by Dr. Everett Rogers of Michigan State University. /1 With the exception of the Columbia University series on adoption of new practices in public schools and several in the area of medicine and engineering, the majority relate to adoption of agricultural practices. The major concern has been to determine:

1. How innovations are diffused to potential adopters by identifying the order in which people adopt new ideas; and
2. How personal characteristics influence the adoption rate of individuals or groups.

The Adoption Process

What does adoption mean? Dr. Shibata identified adoption as "....the acceptance and subsequent utilization of an innovation by a professional or lay person." Rogers in his book Diffusion of Innovation (1962) made this distinction between the definition of adoption and the adoption process: (p. 17) /2

> Adoption is a decision to continue the full use of an innovation. This definition implies that the adopter is satisfied with the innovation.

The adoption process is the mental process through which an individual passes from first hearing about an innovation to the final adoption.

The North Central Sociology Sub-committee for the study of diffusion of farm practices (1961) recognized five stages in the adoption process commonly used by sociologists.[13]

1. Awareness. The individual is exposed to the innovation but lacks the information to adopt.

2. Interest. After the farmer is aware he must also be motivated to continue seeking information. In this step he may come in contact with the change agent and people who have information about the innovation.

3. Evaluation. The farmer mentally applies the innovation to his present and his anticipated future use and decides whether or not to make a trial. In this stage he again comes in contact with a wide range of information sources including the agricultural educator.

4. Trial. The individual uses the innovation on a limited basis to determine its utility on his own farm. This stage may not be possible with all innovations. An example is the bulk milk tank. The farmer must decide whether to adopt without benefit of trial since the cost of the installation as well as the revision of his dairy operation would make trial uneconomical. In the case of fertilizer, a trial on a few rows or a small field can be made without commitment to adopt.

5. Adoption. The innovation is put into full use on the individual's farm. Adoption may not be permanent and the use of a practice may be discontinued at any time. Discontinuance is the decision to cease the use of an innovation after its previous adoption. One reason for discontinuance is the development of a superior substitute for the innovation in current use. An example of the development of replacement innovations was demonstrated in a study of practices adopted by York County, Nebraska, farmers in 1963.[14] One of the 32 practices included in the study was chemical control of corn root worm. The use of BHC was reported as early as 1947 but only 41.0 percent of the farmers had adopted it by 1963. Heptachlor in 1948, Diazinon in 1961, and Thimet in 1962 appeared as replacements for BHC. Diazinon in three years was adopted by 39.0 percent of the farm operators in the study. The annual rate of adoption for Diazinon was over five times that of BHC.

   The appearance of new and superior products posed a special problem to the adoption researcher in that the new product replaced the old before the normal time had elapsed in which all adopters could have adopted the old practice. This phenomenon made it easy to identify the innovator but difficult to identify the late adopters and laggards.

The Diffusion Process

Yesterday, Mr. Bear from Minnesota raised the question of the status of the agricultural educator in the adoption process. A North Central Sociologists Committee (1961) offered this classification of the means used to secure information at each stage of the adoption process.

CHART I

Rank Order of Information Sources by Stage in the Adoption Process

AWARENESS:	INTEREST:	EVALUATION:	TRIAL:	ADOPTION:
learns about a new idea or practice	gets more information about it	tries it out mentally	uses or tries a little	accepts it for full-scale and continued use
1. Mass media-radio, T.V., newspapers, magazines	1. Mass media	1. Friends and neighbors	1. Friends and neighbors	1. Friends and neighbors
2. Friends & neighbors - mostly other farmers	2. Friends & neighbors	2. Agricultural agencies	2. Agricultural agencies	2. Agricultural agencies
3. Agricultural agencies, Extension, Vo-Ag., etc.	3. Agricultural agencies	3. Dealers & Salesmen	3. Dealers & Salesmen	3. Mass media
4. Dealers & salesmen	4. Dealers & salesmen	4. Mass media	4. Mass media	4. Dealers & salesmen

Personal experience is the most important factor in continued use of an idea

We can see that the farm magazine is one of the major sources of information at the awareness stage. Next we note the importance of the sources of information change as we proceed through the stages toward adoption. The North Central Committee reported that when farmers were asked to rank sources of information that magazines, radio, and newspapers were ranked high in the awareness stage. Magazines were credited as the first source of information at the awareness stage by 90 percent of the farmers in York County, Nebraska.[/5]

Farmers who are interested seek information from another source, the agricultural agencies (Extension, Vo. Ag., SCS, etc.). The importance of these agencies increased up through the crucial trial stage. Farmers appear at the door of the agricultural agency with their questions about the value of practices described in farm magazines. Frequently practices described in the mass media do not apply and the agency must advise the farmer not to adopt.

Francis (1960) reported "....that the county agent in the United States may be more effective in preventing the adoption of non-recommended innovations than in promoting the adoption of recommended ideas." [/6]

County Agents frequently express concern over the attention commanded by the farm magazine. Beyond a doubt the magazine has pre-empted all other sources as the first source of new farm practices. Please remember that it is the agricultural educator who is recognized as the preferred source at the evaluation stage or decision stage.

Perhaps we have a more coveted role than we realize.

The Adopter Categories

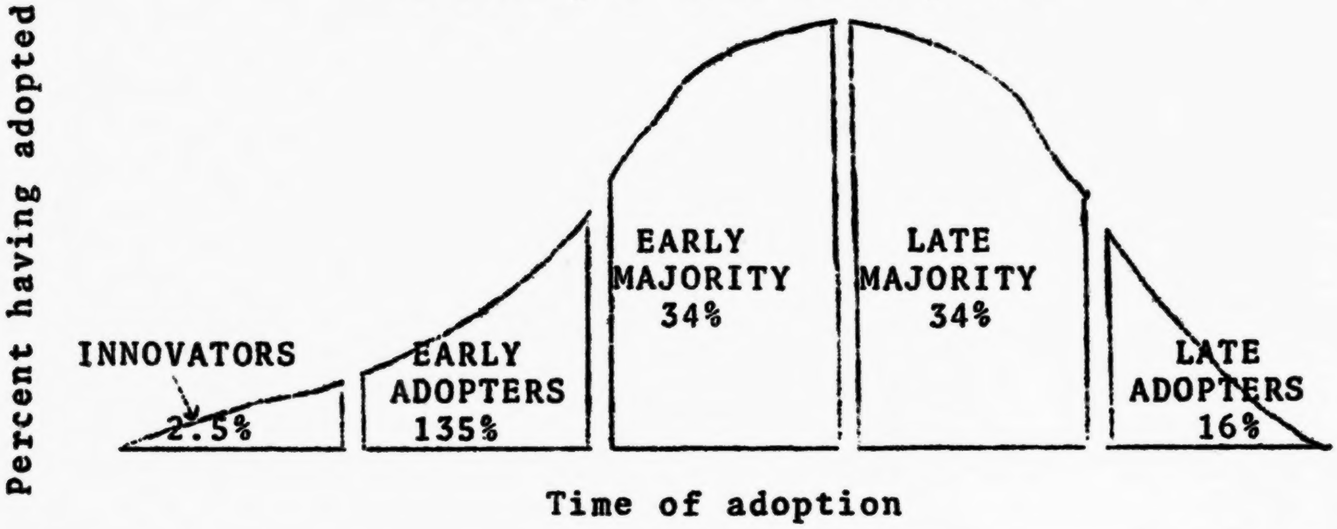
The adopter groups are descriptive categories provided by researchers to group farmers with common characteristics.

Most studies define five adopter categories: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards.

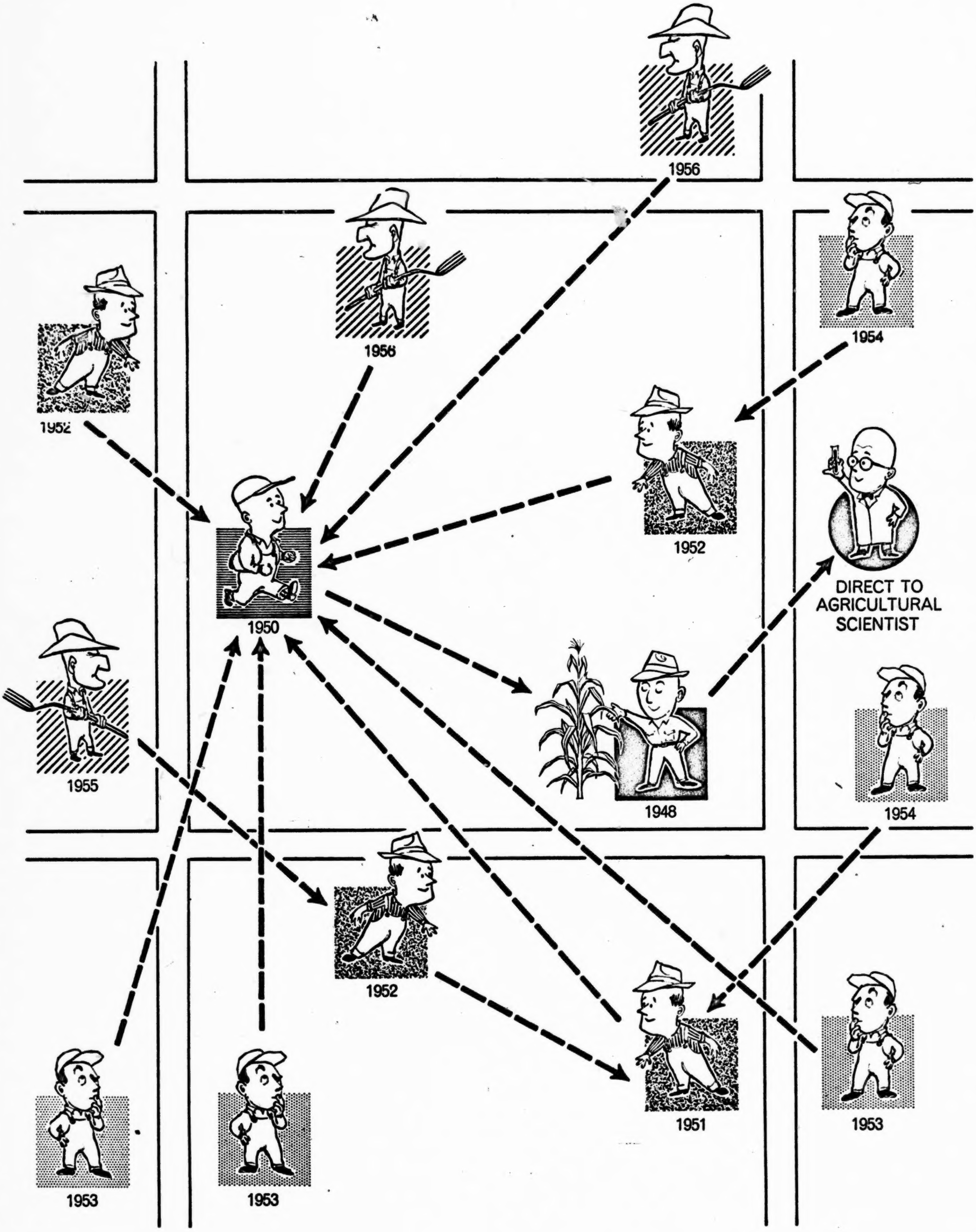
Let us turn now to what is known about adopters of new ideas. Rogers (1962) and other adoption researchers reported that the adoption rate tended to follow a normal curve. Five major categories have been selected to describe adopters.[7]

Chart II

Distribution of farmers among the five categories according to time of adoption.



The first group includes the first 2½ percent of the client system to adopt and are termed innovators. A larger group of 13½ percent are termed early adopters. The third group included 34 percent of the clientele and are termed the early majority. The first three categories make up the first half of the client system to adopt a new idea. The last half includes the late majority, 34 percent and the laggards 16 percent. This system provided the


1956
1956
1954
1952
1952
DIRECT TO AGRICULTURAL SCIENTIST
1950
1955
1948
1954
1952
1951
1953
1953
1953

How fourteen Midwest farmers obtained information on a new farm practice. Farm locations are shown against a mile grid.

researcher a useful way to think about the clientele. The value of this category system is that we can plan an education directed at groups thus identified more easily than we can when we think of 90,000 individual farmers. We can direct our efforts to the 2½ percent and to the 13 percent as the groups most directly connected with either the College of Agriculture or the agricultural agencies. These groups along with the early majority categories include the bulk of the farmers who use institutional sources. These categories include one-half of the farmer population and it is with this half that we have the greatest impact. The late adopters and laggard groups, as we see in the chart, reported that neighbors and friends were more important sources than institutional sources. The county agent or agricultural educator is less effective with this group. Hoffer (1944) indicated that once an idea had been adopted by half of the population, further promotion had little effect./18 As an educator attention should be given to new programs, since further adoption depended largely on the advice received from neighbors and friends.

Application to Agricultural Education

So far we have directed our attention to studies of diffusion and the characteristics of adoption categories. The practitioner in the field may well sit back and say - well so what? What concern should I have with this? I would now like to suggest that the studies cited suggest a kind of framework for his use in thinking about his role as a practitioner.

One function of the practitioner or change agent was suggested by Francis (1960) in his study of adoption in Ohio "....the county agent in the United States may be more effective at preventing the adoption of non-recommended ideas. Earlier in this paper you will remember that farmers are bombarded with a whole series of new ideas by the mass media, and he goes to the change agent, a public employee, to ask for help in sorting out the most effective (recommended) ideas. Competing sources of information available to the farmer provide an overwhelming volume of information and new ideas. Perhaps in terms of the final decision or adoption the agricultural educators have a much higher status than the list mentioned earlier would suggest.

In the whole adoption process, the key or crucial role is performed at the evaluation stages and we might consider Francis' suggestion that our role is in the sorting out process.

Characteristics Affecting the Rate of Adoption

Kivlin's (1960) study of practices adopted by Pennsylvania dairymen determined the influence of the characteristics of the farm practices on the rate of adoption. Kivlin reported that five factors influenced the adoption of individual practices.[9]

1. Economic advantage. What are the advantages (economies) over other practices available? This same observation was made (Lutz, 1963) in the study of practices in York County, Nebraska.[4] Practices that increased total production were adopted earlier (faster rate) than those that prevented losses. For example, the use of BHC as a control for hog lice was adopted at a slower rate than nitrogen fertilizer which resulted in an absolute increase in production.

2. Compatability. Kivlin found that ideas that were compatible with the farmer's value system were adopted earlier than those which were in conflict with his values. Are there certain characteristics of this particular innovation that lead to adoption? A number of years ago a minimum tillage system was developed at the Nebraska Experiment Station. The system involved only a single cultivation operation which was usually done at the lay-by-stage. Minimum tillage fields were weedier than conventional tillage fields. Nebraska farmers have a distaste for weedy corn. Weeds were an example of poor farming in their system of values and hence this form of tillage has not yet become popular. Value systems do change. Hybrid corn was not adopted by all farmers until after World War II. Hybrid sorghum was adopted in approximately three years. The value of hybrid corn has been previously demonstrated by hybrid corn and grain sorghums. Therefore the future acceptance of new hybrid wheat may be rapid.
3. Complexity. How difficult is it to put into operation? Again, in this case of hybrid wheat, the major problem will be the source of seed since planting will apparently be done as in the past. In the case of minimum tillage, a whole new series of skills and machines are needed. Hence, a more complex idea.
4. Divisibility. Can the farmer try the new practice on a limited scale or must he skip this stage and go to the adoption stage without a trial. The adoption of the bulk milk tank proceeded without trial. Trial was expensive and farmers went directly to the adoption stage without prior trial.
5. Communicability. Can the idea be easily observed and evaluated

by potential adopters once the innovator tries it in the community? One of the most evident practices I can think of is the farm record project. Results are not physically visible except in the long-term progress made by the farmer who has a record system. Farmers like other business men are not in the habit of divulging their private accounts to others as easily as they might display results of a fertilizer test plot. Neighbors who drive by can observe the test plot and evaluate any visible results. The value of farm records is not as easily demonstrated in short-run terms.

The agricultural educator should also examine his own feelings about an innovation he is about to promote. A space is provided on the chart to analyze the educator's feelings about a practice before he begins it's promotion. Here I would like to speculate that the agricultural agencies also constitute an adoption system similar to that observed among farmers. Diffusion begins with the research at the college of agriculture commercial laboratory and includes the entire change agent system of county agents, ag teachers, dealers, etc., involved in the diffusion system. In this group you have innovators, early adopters, etc., some teachers recommend new ideas to their students before others. Some sit back and say "I'd like to see someone else try it first." What is your position in regard to adopting new practices? Do new things collide with your value system? As you review the check list, evaluate these points to clarify your own position. The vigor of your program is probably a reflection of how you feel about new ideas.

Next, evaluate people with whom you work, your clientele. How do they react? How difficult will it be to get them to understand?

EDUCATION 206

FACTORS AFFECTING THE ADOPTION OF INNOVATIONS

Characteristics	What are your feelings about this innovation?	How do you think people in your county would feel about this innovation?	What could you as a change agent do to influence adoption of innovations?	What methods would you use?
1. Relative Advantage What are the advantages of this practice over present practices used by your clientel?				
2. Compatibility Are there certain characteristics of this innovation that conflict with existing values and cultural norms?				
3. Complexity Is it simple to understand? to use?				
4. Divisibility Can it be tried on a limited scale?				
5. Communicability or visibility are results easy to observe?				

This device has value to the educator as a method of analyzing new ideas available to his clientele. As a practitioner concerned with problems in the field this is one of your primary concerns. How do I get idea "A" adopted? How do I analyze the effort I must make? What are the major objections to be overcome before it will be adopted? In designing an effective approach I offer this technique for your consideration.

In the future, we hope to be able to offer a more sophisticated model to explain the dissemination process, and recognize some of the potential value of such knowledge. The diffusion and dissemination studies have provided some guides to the adoption of new ideas and systems through which they reach the client system. The knowledge of the results of diffusion research can make us more effective - if we are ready to adopt them.

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EVALUATION OF RESEARCH*

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First of all, I have made the assumption that our primary concern for evaluation this morning would be that of evaluating research efforts, per se, and not that of evaluating a total vocational education program.

My assignment at The Center for Vocational and Technical Educatior at Ohio State University is concerned with both aspects--that of assisting Center specialists and other research groups concerned with vocational and technical education in designing and developing their research ideas and also working on The Center's efforts in developing a model for use by states in evaluating their total efforts in vocational and technical education.

Allow me to present a few very general thoughts on the topic now and then possibly go into greater detail in our small group discussion session later this morning.

This will be sort of a "Heinz 57 variety" discussion of evaluation. The 57 stemming from my use of five principles and seven potential pitfalls in evaluation activities.

THE FOLLOWING FIVE PRINCIPLES PROVIDE A GENERAL FRAMEWORK FOR THIS DISCUSSION

PRINCIPLE NO. 1 DETERMINE AND CLARIFY WHAT IT IS THAT IS TO BE EVALUATED

Mager, in his book on Preparing Instructional Objectives[1] points out that the correct stating of objectives is the key to evaluation. That the objective must be so written as to describe the intended outcome. That objectives should be so written as to tell you what the learner will be doing and under what conditions he will be doing it when he is doing what it is you expected him to be able to do. The objective, therefore, aids evaluation and evaluation in turn, contributes to the accomplishment of objectives.

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* Paper presented at Central Region Research Conference in Agricultural Education, University of Nebraska, Lincoln, August 2, 3, 4, 1966.

[1] Robert F. Mager, Preparing Instructional Objectives, Fearon Publishers, Palo Alto, California, 1962, p. 53.

To quote Mager, "an objective will communicate your intent to the degree you have described what the learner will be doing when demonstrating his achievement and how you will know when he is doing it."

Mager was, of course, referring to the writing of instructional objectives; however, what he says applies, at least in part, to the writing of research objectives.

In my opinion, more than half of the problems arising in evaluation stem from poorly thought out objectives, and many of the remaining problems arise in finding the right approach for assessing project outcomes.

Let me give you an example of a research proposal in which the objective and evaluation sections are so written as to create, rather than solve problems. This is a legitimate proposal recently submitted for funding; only the subject identification has been changed

OBJECTIVE: To prove that the best method of teaching ______________ is by use of community resources and audiovisual aids that will make ________________ attractive, interesting, and meaningful.

This is the one and only objective listed in this study.

Let's next move into the proposal to see how this researcher plans to carry out his evaluation, testing to see if he has achieved his stated objective.

"THE FOLLOWING CRITERIA WILL BE USED IN EVALUATING THIS EFFORT"

1. Is the program in keeping with what we know about good education?
2. Does it grow out of regular classroom activities?
3. Does it challenge the student's interests?
4. Will it take the student beyond his present knowledge into new and enriched experiences?
5. Does it give the student an opportunity to do creative work?
6. Will it cause the student to do critical thinking?
7. Will it cause the student to develop new, broader, and deeper interests?
8. Will it give the student new insights into new interests?
9. Will multiple skills and abilities be gained by carrying on this type of activity program?

Would you say this person is whipped before he begins? The sad part about it is that this kind of writing shows up in proposals day after day with field readers given little choice but to turn them down.

WHAT CAN THE RESEARCHERS DO?

1. Decide what the purpose is of the evaluation before he decides on any particular approach to evaluation.
2. He can make a decision as to what is to be evaluated, then select the data collecting devices, instruments, etc.
3. Make a decision as to what is to be valued in the evaluation and why it is important.
4. Write objectives that can be evaluated.

PRINCIPLE NO. 2 SELECT THE EVALUATION TECHNIQUE IN TERMS OF THE PURPOSE TO BE SERVED

Too often the techniques of measurement used are selected on the basis of accessability rather than on how accurately they assess the most "potent variable" or describe the crucial criteria or key indicators in evaluation. Almost any technique has an appropriate use and purpose--finding the one that measures the most crucial factors in your research effort is worth searching out.

PRINCIPLE NO. 3 CONSIDER MORE THAN ONE WAY OF GETTING MAXIMUM YIELD OUT OF THE EVALUATION

Just as no one device or technique is adequate for measuring or determining all possible outcomes. I'm also convinced that many researchers stop short of a complete evaluation. They stop before they have gleaned the maximum information from their evaluation activity. Let me use a simple illustration of this principle.

I read recently of a rather sophisticated bit of supermarket research where the primary objective was that of trying to figure out how to get more of the housewives' dollar and keep her happy in doing so. This study, by using a simple survey technique, found out that:

the average shopper spends 20-24 minutes in the store,
buys an average of 25 items,
spends between $11-16,
2/3rds of the average income shoppers don't have a list, while
50% of upper income people do;

31% of purchases are specifically planned,)
50% of purchases were unplanned (impulse buying),) = 100%
17% were thought about but not specifically planned,)
2% are substitute items;)

69% of brand decisions are made at the instant of purchase
65% of egg purchases were planned
75% of purchases of scatter rugs, sponges, are unplanned.

Now the researcher could stop his analysis here, publish a report and it would all make for interesting reading. It tells a lot about the shopper, but it really doesn't tell much about how the store manager can get the shopper to spend more money, which was the original objective.

I'm happy to say that this research group didn't stop with just this descriptive report, but went on into a modified time and motion study observing the shoppers movements, second by second. From this, they found that:

10 seconds is all that is spent in buying laundry soap and most of this is spent in loading it into the cart,

3.6-4.3 minutes are spent in waiting to get checked out,

2 minutes are spent in shifting items about in the cart,

50 fixed eye contacts are made of products on the shelves.

These findings go on and on, but a few of these are sufficient to illustrate a point.

How did the researchers get multiple yield from their data? They did as follows:

1. If it takes her only 10 seconds to buy laundry soap, don't spend any money on this section, give it a fairly low priority corner or end of the aisle space.
2. Keep the high mark-up items at eye level--the shopper makes an average of only 50 fixed eye contacts--make every one count.
3. Capitalize on that 3-4 minute wait at the checkout counter. Stock this area with impulse items. Chewing gum and marshmallows are two of the best "impulse items".

4. Put the bread and soft fruit near the end of the shopping pattern--this will cut down on time spent shifting items in the cart and allow a few more eye contacts.
5. Keep the candy, cookies, and breakfast cereals high enough so that the kids in the cart can see them--this extra pair of eyes increases your total number of eye contacts.

These researchers milked every idea they could from the data and it is paying dollar dividends.

How about some of our job competency studies in agricultural education? Are we getting maximum yield from them--or do we evaluate too grossly? I'm convinced that many of these studies settled for too little information. Wouldn't it help us to know more about the critical 10 seconds or 10 minutes in a workers application of skills? Or what is the best traffic pattern for teaching the "cluster skills"? This whole idea borders on the critical incidence technique now receiving increased attention in a number of educational research efforts.

PRINCIPLE NO. 4 KNOW THE LIMITATIONS OF EVALUATION TECHNIQUES

I'll skip over this area rather quickly, because the limitations are discussed more completely under the pitfalls section of this paper. There are, however, three factors to keep in mind here:

1. That even our best educational measuring instruments fall short on the amount of precision we would like to have.
2. That much of evaluation depends upon interpretation of meaning and is thus subject to many human errors.
3. That a healthy awareness of the limitations should encourage the use of more than a single evaluation technique.

PRINCIPLE NO. 5 EVALUATION IS A MEANS TO AN END AND NOT AN END IN ITSELF

This, of course, is another version of the old and often repeated statement that evaluation to be effective must be continuous.

If the research effort has been worthwhile doing and if the evaluation points out anything either positive or negative--you haven't completed the task if you stop there.

Get the results into action programs or into decision making places.

Use the results in structuring subsequent research plans.

Walter Finke, President of Electronics Data Processing Division of Honeywell, says:

> "... information is the last great frontier of man. Diligently gathered it will fill gaping holes in man's body of knowledge. Carefully organized, it can serve virtually any human discipline. Readily available, it can be marshalled at the time decisions are to be made, rather than days, weeks, or months later. Properly used, it can indeed become a deliverance from human ignorance and lack of knowledge."

We are approaching a period of time when the results from research will be fed quickly into information retrieval systems and available to all--but, all the information retrieval systems and piles of abstracts aren't going to be worth the microfilm they're printed on if the evaluation wasn't carried out right in the first place.

There are undoubtedly many other principles that could be added to the five presented, but let me go on to a brief discussion of seven recognized evaluation pitfalls.

PITFALL NO. 1 BIAS

This is one of the most prevalent pitfalls.

It is difficult for any researcher to maintain complete objectivity--to put aside his preconceived ideas on the issue, but let's face it there is sufficient flexibility possible in the treatment of most data to influence almost any finding.

Too often evaluations are completed, decisions are made and most of it based on preconceived ideas. Statistics are used only as a pretense that the decisions reached had a sound and logical base. I'm not suggesting that the data in some studies are changed, rather it is the interpretation of the findings that undergoes mass manipulation in order to put forth the "right answer".

There is a saying which says: "There is no process of amalgamation by which opinions, wrong individually can become right merely by their multitude."

So is it also with research data, there is no process of "computerization" whereby data, wrong in the first place, can become more right merely by their manipulation.

PITFALL NO. 2 NON-COMPARABLE DATA

This refers to a failure on the part of the evaluator to make sure that data used in making comparisons are comparable in every way.

This pitfall can create problems in much of our present research--we need to be very careful in drawing conclusions based upon the comparison of today's figures in vocational agriculture with those collected five years or ten years ago.

How to get comparable data is largely a design problem--but if the design is wrong, you can't skew your evaluation to correct it.

PITFALL NO. 3 UNCRITICAL PROJECTION OF TRENDS--OVERWORKING THE DATA

Here I am talking about making predictions for the future based upon existing or past trends. We need to make a number of manpower and other projections today, but in so doing, we have to take into account the factors that were influential at the time the original data was collected. We have to ask the question as to whether these same influences will be existent in the projected period. If not, the projections become meaningless and probably dangerous.

A recent publication[2] from the U.S. Office of Education entitled Research Needs in Vocational-Technical Education for Program and Career Planning lists the analysis and projection of employment, economic and demographic trends as one of the significant areas of needed research for strengthening vocational-technical education.

Those working in projecting needs in agricultural education need to be alert to the inherent problems in this pitfall as they project manpower needs, teacher needs, etc.

PITFALL NO. 4 IMPROPER ASSUMPTION REGARDING CAUSATION

It's not so difficult to find out what happened if you have accurate data, but why it happened is another matter and, of course, if you have poor data in the first place, this only compounds the problem. Understanding the cause and effect relationship between events is an extremely important element in any research effort and especially in the evaluation phase.

Too often, we jump to the quick conclusion that the change in one event was the cause of change in the other when very often an unknown third factor probably caused the change in both.

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[2] Research Needs in Vocational-Technical Education for Programs and Career Planning, Prepared in the Employment Opportunities Branch, Division of Adult and Vocational Research, Bureau of Research, U.S.O.E. July, 1966.

This is probably best illustrated by a story heard recently.

The story is about four people: a young, dashing, Russian army officer, a Rumanian businessman, a very pretty young girl, and an elderly woman. All were sitting in the same train compartment riding through Rumania. They came to a tunnel, and while they were in complete darkness, a resounding kiss and a slap were heard. As they came out of the tunnel, the elderly woman was thinking, "I'm certainly glad that young girl defended her honor against the Russian." And the young girl thought, "I wonder why the Russian kissed the old lady instead of me," and the Russian thought, "Clever of that Rumanian to kiss the girl and have me get slapped," and the Rumanian businessman chuckled to himself, "It's my lucky day. I kiss the back of my hand, pinched a young lady, slapped a Russian, got an old lady's mind occupied, and got away with it all."

Of course, the moral to the story is to know what caused what before jumping to any hasty conclusions.

PITFALL NO. 5 MAKING COMPARISONS WITH AN ABNORMAL BASE

Here, I am referring to the comparison of results of studies with those of previous standards which were atypical.

Recently, someone pointed out to me the following error is his wife's thinking about rising food costs. His wife was comparing what she spends today for food against her old grocery figures for the same month ten years ago. It was, of course, several times higher, even greater than normal inflationary trends would lead her to expect. A more careful analysis, however, pointed out that it wasn't all in the rising cost, but the change that has taken place in food markets today. About 50% of this lady's food budget spent at the grocery store consisted of such items as aspirin, garden seeds, flower plants, rugs, charcoal, etc. Many of the items being included as food budget items were in past years bought at stores other than food markets. Therefore, in establishing comparative basis for current evaluation efforts in agricultural education, we need to be aware of this trap.

PITFALL NO. 6 IMPROPER SAMPLING

This has reference to taking an improper small sample and generalizing findings back to a larger group.

A good illustration here is the study made by one of the major toilet paper manufacturers who decided that they should get into the production of colored toilet paper. They hired one of the nation's leading research firms to determine what colors they should produce. A probability sample was drawn, a survey made, and the colors one would expect to be preferred--green, yellow, blue, and pink showed up, but topping the list was rose. The company made rose colored paper, but it didn't sell. What went wrong? Did people change their minds? Do color preferences for toilet paper change with the seasons? Do people want cool colors in the summer and warm ones in the winter? Was it a poor sample? or What? The answer was in sampling, although it was a good sample from all apparent aspects, about a third of the families interviewed lived in a major housing area in which all the bathrooms were rose colored and they wanted matching paper. Across the country, there were relatively few rose colored bathrooms.

Where the sample is improperly selected, the evaluation becomes meaningless.

PITFALL NO. 7 MISUSE OF STATISTICAL METHODS

We're all guilty on this one.

Applying non-correlated techniques to correlated data.

Using analysis of co-variance on data that really deserves no more than mean, median, and mode treatment.

Probably the answer on this pitfall is to seek the advice and assistance from someone able to distinguish between the right and wrong methods for a particular situation.

Briefly, let me summarize my very random comments about evaluation emphasizing again the need for:

1. very carefully taking evaluation into account when you write your objectives,
2. for care in selecting and use of evaluation techniques, and
3. getting maximum utility from the evaluation that you do carry out.

DIFFUSION AND ADOPTION OF RESEARCH RESULTS*

by

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This paper concerns the diffusion and adoption of research results in the field of education. I recognize that those of you in attendance are knowledgeable about public education; but you come from a tradition of colleges of agriculture, which means that many of the things about which I will be speaking are quite familiar to you in terms of diffusion processes. The interesting thing is that it has taken us so long to come to recognize the necessity for some designs to translate research into practice in the field of public education.

Only a few years ago educators assumed that all you needed to do in order to get research results translated into action was to conduct basic research, to apply the research generated and to write up the results into neatly bound reports which were then delivered to the U.S. Office of Education. The only problem was that we discovered that most of these reports collected dust, or worse, were lost in the process of the many changes and/or moves. We suddenly discovered that the research which might have pointed the way to doing things in more advantageous fashions weren't being communicated to the appropriate individuals and school systems across the country.

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*Presented at the Regional Research Conference for Agricultural Education, University of Nebraska, Lincoln, Nebraska
August 3, 1966

A few years ago a number of persons began to be greatly concerned about the process of change, particularly in public education, so that some preliminary models and strategies were developed. Attempts were made to take propositions coming from basic research and adapting them to school systems and classrooms.

What I'd like to do first is to look at some of these early models. They were early only because they were developed three or four years ago. As one looks at them today it's evident that they were over-simplified in terms of the difficulties that we face in stimulating processes which will enable us to get the changes needed in education. One of the earlier models that we can find in the literature is one developed by Coughenour (See Figure 1) a sociologist at the University of Kentucky. Coughenour, along with other sociologists in the country, has been very much concerned about the general process of innovation and diffusion, and recently these scholars have been applying some things derived from that particular discipline to the field of education. Coughenour's model is really closer to agricultural models than some other models coming from education. Coughenour suggested that first of all in terms of research, you need to work with the scientist who is doing basic kinds of research in the laboratory. He suggested, for example, that these need to be people who are basic researchers representing a number of disciplines. You see the counterpart of this phase in the college of agriculture which has its various science departments. There is communication and liasion among people in such disciplines as botany and zoology, which produces basic resarch. Secondly Coughenour says that after one has the kind of situation that enables you to produce basic research you must have some kind of innovative system. The

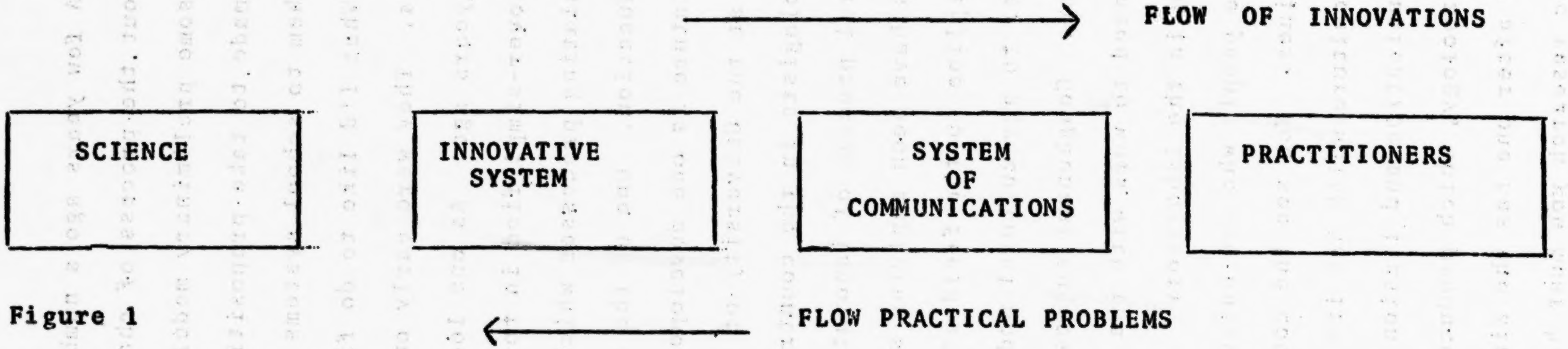
FLOW OF INNOVATIONS
SCIENCE
INNOVATIVE SYSTEM
SYSTEM OF COMMUNICATIONS
PRACTITIONERS
FLOW PRACTICAL PROBLEMS

Figure 1

— COUGHENOUR

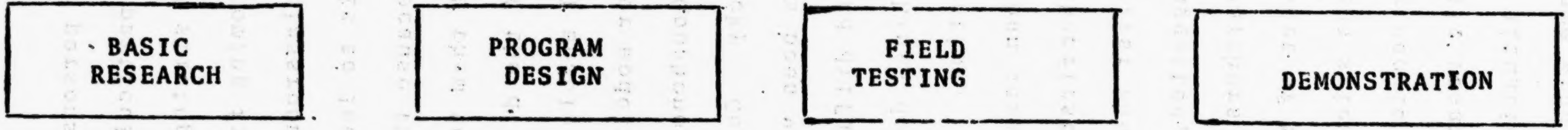
BASIC RESEARCH
PROGRAM DESIGN
FIELD TESTING
DEMONSTRATION

Figure 2

— BRICKELL

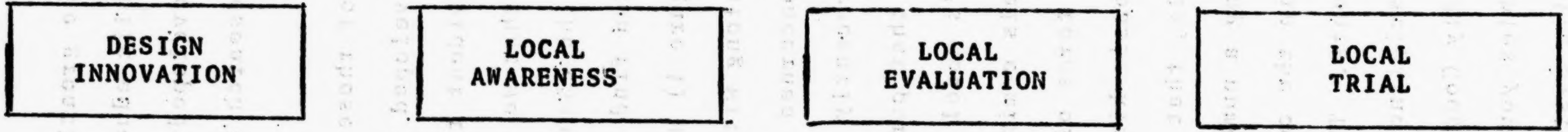
DESIGN INNOVATION
LOCAL AWARENESS
LOCAL EVALUATION
LOCAL TRIAL

Figure 3

— MILES

innovative system that he describes is related to the roles of county agents and the home demonstration agents. Such a system enables research to be brought from the laboratory and applied to the field. He says we ought to consider some kind of system in education, either in terms of people or organization, which would make it possible to get the research results to the school systems, the teachers and the students.

The third part of the model is a system of communication. He really separates the innovative system from the rest of the model although I'm not certain if one should do so. In the field of agriculture the system of communication has generally been located in the college of agriculture. The editorial staff in the extension service which produces bulletins is a part of this system of communication. In adddition to formal systems he suggests that there should be other kinds of informal systems to supply information through publications, magazines, and newsletters. It is very clear how such a system works in agriculture, because The Farm Journal, for example, and many other similar publications select researches which are coming from the colleges of agriculture and communicate them to the farmers. Interestingly enough, the publications in the field of education have completely eliminated research sections. We eliminated them because there was a feeling that teachers, superintendents and boards of education were not interested in such complex and abstract matters as research. There is a real void of professional publications or research reports which can be interpreted by practitioners.

There are a couple of weak elements in Coughenour's model. He has an arrow indicating the flow of innovations as coming from the scientist and moving toward the practitioner. Then you will notice he indicates a flow of practical problems coming from the practitione toward the laboratory. I would suggest a model which has a "flow" going in both directions. I believe very strongly that there are creative and innovative people who are in the field and doing highly creative things, so that our system should provide a flow in both directions. The model suggests good practices, processes and new technologies which are developed in the field as being sent back to the laboratory for further research and refinement. The reverse should also be true. There should be a touch of practicality on the part of the investigations that are being conducted in the laboratory in order to be certain that if new ideas are developed they should have some likelihood of being applied and accepted by the people out in the field.

One of the people who is very well known in the field of public education is Mitch Brickell, formerly of New York State, for his publication "Educational Changes in New York State". It is one of the landmarks describing innovations in public education. Brickell's model (See Figure 2) starts in very much the same way as the Coughenour model, with basic research followed by program design. What he suggests is taking the basic research and having some place where the research can be translated into hardware or software. These two together represent the "r" and "d" function which is a basic par of the industrial picture where you will find a basic research branc and a development area. Scientists are at work in the "development area" in translating the basic research into either hardware or software which will have some usefulness. Brickell is saying that in education we need to begin with basic research, but that a missing element has been the development phase.

A third area which Brickell says is important is field testing. Field testing moves the development one step further away from the laboratory. Brickell says that you can't put these things in practice or generalize upon a new practice or technique until it has been field tested in a large number of situations. Salk vaccine is an excellent example of the field testing of a product. In the early development of the vaccine samples were sent around the country in order to conduct field testing. Even field testing isn't enough because even though a product is tested in Lincoln, Nebraska; Columbia, Missouri, and other places, everyone is not convinced that you should do something about it nor do such results prescribe exactly how to utilize it. And so Brickell indicates tha an additional item must be built into the system, which is a very large number of demonstration centers. Something similar to demonstration farms are needed where people in a neighborhood can come in and take a look at what's going on. In education, for example, talking to students, teachers, and parents and getting the low-down as to how well the new idea is really working and seeing it function in a real situation is necessary. The Brickell model has some excellent points, but it too has a fundamental weakness which is the one directional flow from basic research to demonstration.

The third model is the one developed by Mat Miles (See Figure 3) from Teacher's College, Columbia University, and who has edited the book, Innovations In Education, which is the only substantial volume to the present time which deals with adaption in education. He indicates that we need initially a capacity for designing the innovation. Second, is to create local awareness and third is a matter of local evaluation. Miles feels strongly that unless the people at the local level have some opportunity to evaluate an innovation in terms of its success, it really won't be acceptable in the long run. After local evaluation, you then move to the fourth category which are local trials in a number of situations but short of total adoption within the system.

After examining these models, which are reasonably simple, let us look at a little different kind of model. It is one which Egon Guba and David Clark, formerly at Ohio State University designed (See Figure 4). Guba and Clark have looked at the problem from a little different point of view. What they have projected are steps from research, development, dissemination, demonstration, and implementation. One thing that this model assists one to do is to be mor definitive about each one of the categories. There is a tendency to talk about all these steps as being the same or similar things. What Guba and Clark have done is to break down these categories in terms of how each serves as a step in the total process. On the left hand side you will see three categories. First, the objective of each category; second, the criterion to be applied; and third the relatio ship of the category to change itself. You will note that they have indicated the basic purpose of research is to advance knowledge. Th major criterion is whether it is valid or not. Its relationship to change is that it provides the basis for change because one of the purposes of research is to provide a basis for change from which development can occur. It provides the basic data from which innovatio and development can occur.

Second, is the area of development. The purpose of development is to apply the knowledge. The criterion that you apply to "development" is the feasibility of the new process, technique and its

RESEARCH INTO ACTION

	RESEARCH	DEVELOPMENT	DISSEMINATION	DEMONSTRATION	IMPLEMENTATION
OBJECTIVE	TO ADVANCE KNOWLEDGE	TO APPLY KNOWLEDGE	TO DISTRIBUTE KNOWLEDGE	TO BUILD CONVICTION	TO FACILITATE ACTION
CRITERIA	VALIDITY	FEASIBILITY PERFORMANCE	INTELLIGIBILITY FIDELITY COMPREHENSIVENESS PERVASIVENESS	CREDIBILITY	EFFECTIVENESS EFFICIENCY
RELATION TO CHANGE	PROVIDES BASIS INNOVATION	PRODUCES INNOVATION	INFORMS ABOUT INNOVATION	PROMOTES INNOVATION	INCORPORATES INNOVATION

Figure 4

level of importance. In the demonstration phase the research knowledge is moved to the development of hardware or software and try them out to determine their feasibility. The relationship to change is that it really provides or produces the innovation.

The third category is dissemination. Its purpose is to distribute knowledge. The criterion that you apply to demonstration is whether it is intelligible, has fidelity and is comprehensive and pervasive. At the dissemination phase, you are attempting to discover whether it will work in a variety of circumstances. Can it be interpreted, understood and applied by the people involved? You are now several stages from the basic research which has by now been translated into a form which can be examined.

Demonstration is to build conviction. When you have a demonstration plot, school or program, its purpose is to convince others that it is advantageous to follow it and that it should be applied to their system. The criterion to be applied is credibility and the purpose of demonstration is to promote innovation. This technique has been used greatly in agriculture and has been used to some degree in education. You have surely utilized it more in vocational education than in other areas of education. Not very much has been accomplished in public education in terms of demonstration areas or demonstration schools. About the most that we have done here is to develop laboratory schools that were really demonstration schools. The only problem with the demonstration school was that the outside observers looked at what was going on and felt that it would not work for them because it was connected with a university. Because the students and teachers are special visitors are encouraged to believe that it would not be successful in their locale. What happened in lab schools and demonstration school was not deemed applicable to local systems. This is one of the reasons why University o Nebraska and many other colleges and universities are phasing lab school out.

At the implementation stage the purpose is to facilitate action of one kind or another. After visitors have inspected demonstration it is hoped that they will translate what they learned and implement it in their own school system. The purpose of implementation is to bring about the most rapid adoption or adaption of the idea in other school systems. The criterion is effectiveness and efficiency. At this point we are no longer interested in proving whether it's a good idea but rather to find ways of communicating the essential aspects of the innovation to other people and helping them to put the new idea into practice. The relation to change is that it incorporates the innovation into the on-going organization of the school system. It seems to me that this is a very helpful kind of design in enabling us to look at the total process because it breaks down the different steps and the different phases so that we don't mix them all together.

In somewhat along the same line, let's examine a sociological model I've attempted to apply to the field of education. This model (See Figure 5) of adoption is one which includes awareness, interest evaluation, trial and adoption.

Let's look first at awareness. At that point massive communicative devices should be used because this phase represents a "shotgun" approach. In this particlular process one should be aware that he is going to be contacting only a small number of the people who are innovators. You are trying to reach as many of the people as

MODEL OF ADOPTION

AWARENESS	INTEREST	EVALUATION	TRAIL	ADOPTION
Mass media	Classes	Individual and small group conference	Individual consultation	Reports back on use (feedback)
Mass meetings	Telelecture	Telephone (WATS)	Simulation	Utilized as resource (writing, speaking, visualizing)
Conferences	Special packages	Abstracts, letters	Case studies (print and media)	
Newsletters	Demonstrations	Programmed instruction	Models	
Speeches and lectures	Bibliographies	Correspondence study	Mock-ups	
Tapes (audio and visual)	Traveling exhibits	Microfilm reports		
Mobile units		Surveys		

Figure 5

possible with your message because only a few people out of the total population will desire to do something. Mass meetings, conferences, newsletters, speeches, lectures, tapes, audio and visual devices and mobile units of different kinds are some of the things that can be used at this stage. What you are trying to do is to alert people to the fact that there is a new exciting idea and that they ought to be informed about it.

The next stage is interest, which includes 10% to 15% of the total population who are likely to do something about new ideas. When you begin to isolate those people who have some interest and are likely to react favorably to a new idea, you must in turn begin to concentrate your communication. Classes, tele-lectures, and various kinds of special packages that are developed to communicate messages to individuals or small groups are then utilized. Bibliographies of various kinds along with traveling exhibits emerge as useful at this point.

Evaluation requires one to be more and more personal in his communication. You must communicate with this smaller group who are interested and assist them to evaluate whether the proposed idea has merit for them. Individual conferences, telephone calls, abstracts, letters, programmed instruction, correspondence study, microfilm study, and surveys should be utilized.

Finally is the trial itself. During the trial period generous help must be given to persons trying out the idea. They will require consultants and specialists who can give them not only the assistance they need but also encouragement. Simulation, models, case studies and mockups are needed to help individuals to understand how to adapt the new ideas to their own situation. They will need encouragement as much as anything else at this stage since they will be attacked often by their colleagues and critics. This is one area which seems different in education than agriculture. Generally new ideas are desired by farmers. There have been cases, however, where people who had exciting ideas in education were forced-out of institutions by their colleagues who did not appreciate or agree with them.

Last is adoption. I'm suggesting here that we use persons who previously adopted the new idea. Adopters could help us report case studies in order to help to convince others. Quotes you see in the newspapers about how well some one likes a certain kind of cigarette are similar to statements we might explore using in education.

Let's look at a couple of other models. Havelock presented one (See Figure 6) at a meeting of the Educational Research Association. It includes the scientist's translating the information to departments of agriculture and to those associated with experimental farms, and to the extension specialist who has frequent contacts with the county agent who in turn is in touch with the farmer. This model indicates a flow in both directions.

A medical model (See Figure 7) has been included to suggest the differences between education and other kinds of enterprises. In the case of medicine there is a somewhat different system of incorporating new ideas into the system. It begins with science departments of universities where the knowledge is translated into journals, textbooks and other kinds of scientific publications. Next it moves to the medical college for use in medical training and hospital research. You will notice there is another arrow that comes down to the pharmaceutical houses which happen to be the

AGRICULTURE MODEL

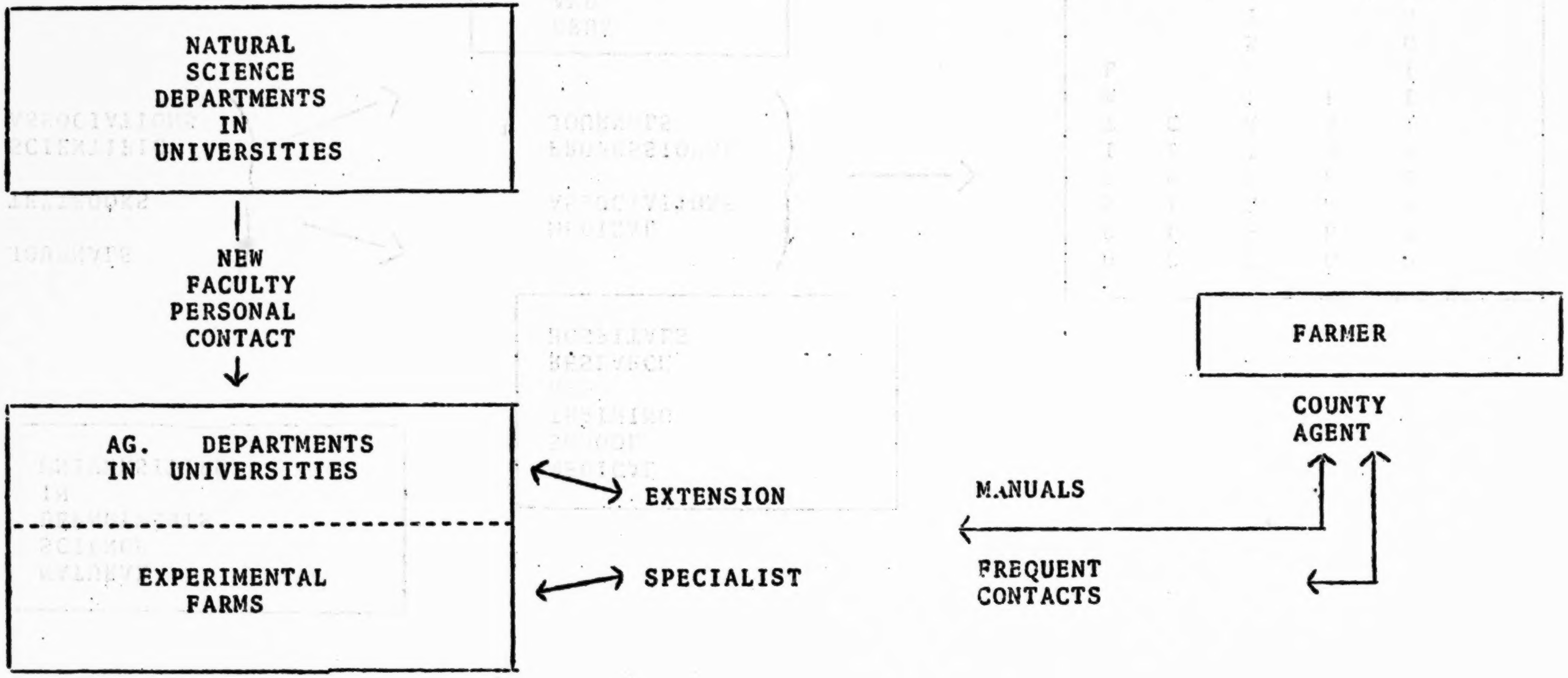
NATURAL SCIENCE DEPARTMENTS IN UNIVERSITIES
NEW FACULTY PERSONAL CONTACT
AG. DEPARTMENTS IN UNIVERSITIES
EXPERIMENTAL FARMS
EXTENSION
SPECIALIST
MANUALS
FREQUENT CONTACTS
FARMER
COUNTY AGENT

Figure 6

M E D I C A L   M O D E L

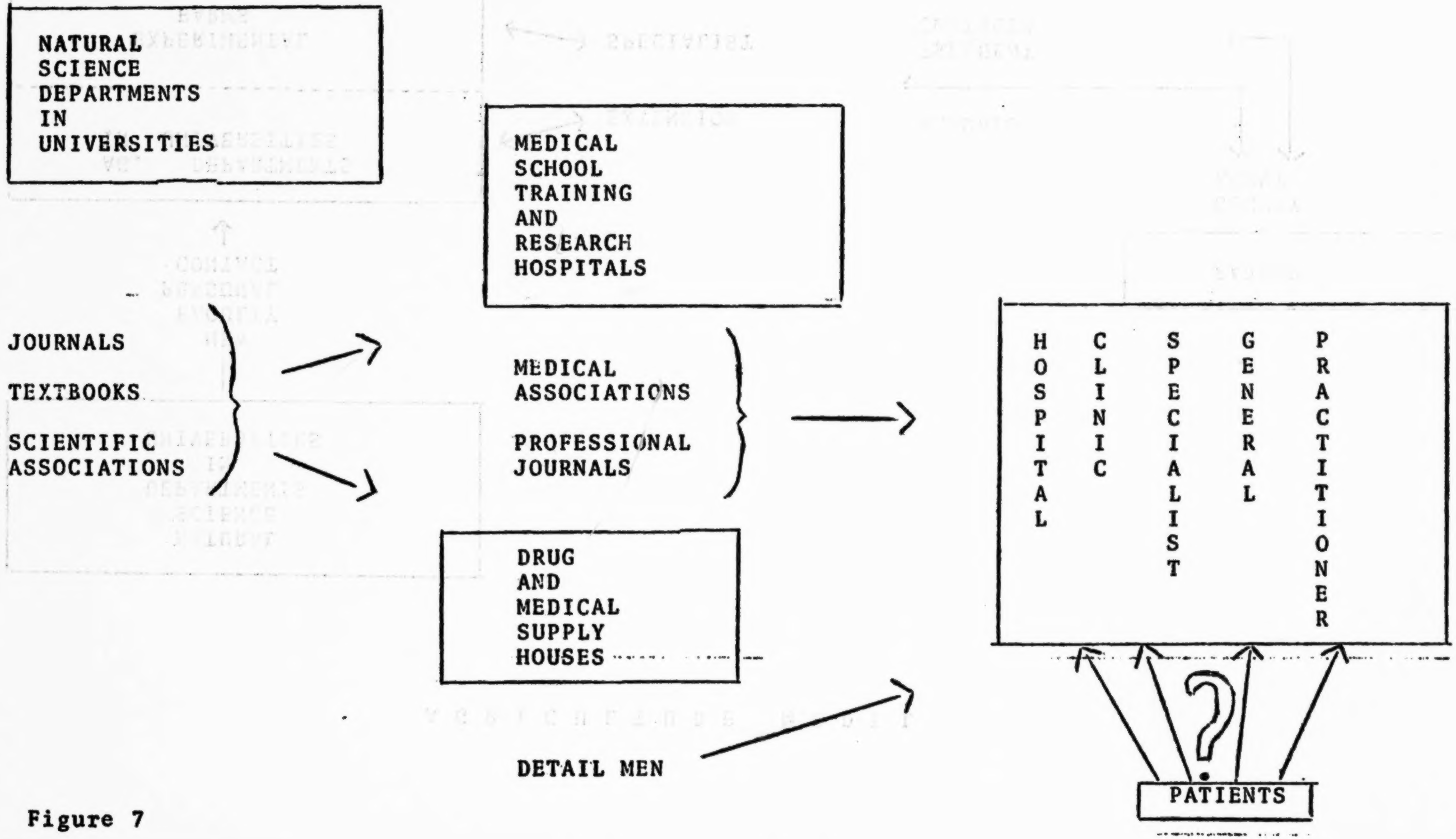
NATURAL SCIENCE DEPARTMENTS IN UNIVERSITIES
MEDICAL SCHOOL TRAINING AND RESEARCH HOSPITALS
JOURNALS
TEXTBOOKS
SCIENTIFIC ASSOCIATIONS
MEDICAL ASSOCIATIONS
PROFESSIONAL JOURNALS
DRUG AND MEDICAL SUPPLY HOUSES
DETAIL MEN
HOSPITAL
CLINIC
SPECIALIST
GENERAL
PRACTITIONER
?
PATIENTS

Figure 7

avenue through which doctors get much of their information. In the case of medicine, information is obtained more often from the drug salesman who calls at the doctor's office than from the college of medicine. The drug and supply houses employ salesmen who carry messages directly to the doctor's office. Medical colleges are attempting to do something about the problem but they are having a very difficult time because it's almost impossible to get doctors away from their practices to attend seminars. I don't know if you have seen some of the novel things that drug salesmen do. One is to develop programmed instruction and 8mm films for use by their drug salesman. The salesman slips into the doctor's office and catch him for 3 or 5 minutes during which time he shows him a single concept film on a new drug idea.

Another thing which is different about medicine than agricultur is that in agriculture the farmers talk a great deal to each other. They don't always talk about newer agricultural practices but among this conversation is often some talk about new farm practices. Doctors do not talk to each other very freqnently about the kinds of things which work for them and as a consequence there is a different kind of adoption model which applies to new drugs than to new agricultural practices.

One of the newest models that I have encountered is one developed by Gordon Lippitt (See Figure 8) which he calls a "Knowledge Utilization Model for Educational Change." The process is identified on the main stem of the model. The identification of a concer is fundamental and unless people get the idea that they aren't doing as well as they should you won't proceed very far with making changes. Second is to have some kind of analysis of the situation.

KNOWLEDGE UTILIZATION MODEL FOR EDUCATIONAL CHANGE

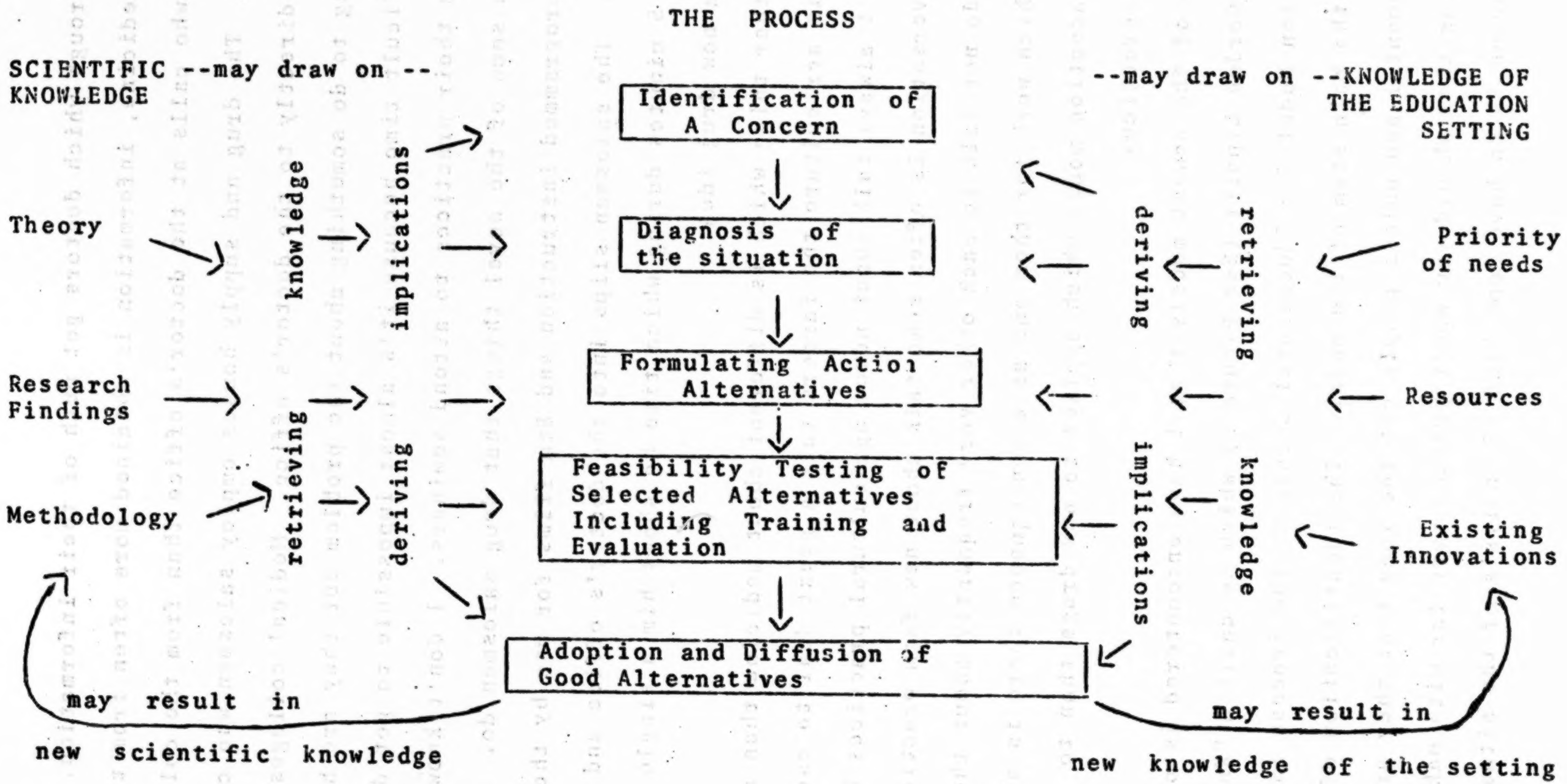
THE PROCESS
SCIENTIFIC KNOWLEDGE --may draw on --
Theory
Research Findings
Methodology
knowledge
implications
retrieving
deriving
Identification of A Concern
Diagnosis of the situation
Formulating Action Alternatives
Feasibility Testing of Selected Alternatives Including Training and Evaluation
Adoption and Diffusion of Good Alternatives
--may draw on --KNOWLEDGE OF THE EDUCATION SETTING
Priority of needs
Resources
Existing Innovations
retrieving
deriving
knowledge
implications
may result in
new scientific knowledge
may result in
new knowledge of the setting

Figure 8

Lippitt calls it the diagnosis of the situation, which is a point at which outside specialists or consultants might be brought in to help in the diagnosis.

Third is to formulate actions choosing various alternatives that might be successful in your situation. Fourth is to test the feasibility of certain selected alternatives including training and evaluation. One of the reasons Lippitt specifies training is that he believes very strongly that you won't get a permanent change until you change the behavior of people at the local level and they accept totally the new idea. If they don't change they will eventually sluff off the new idea and revert back to where they were before. Lippitt says, therefore, that if you are going to get final adoption of an idea, you are well advised to develop a training program with evaluation built in. Final adoption and diffusion of promising alternatives completes the process.

The scientific knowledge required is shown on the left hand side of the model. You will notice that Lippitt specifies theory, research findings, and methodology as all being needed. What he is saying is that if you're going to accomplish much, you need scientific knowledge, an adequate system of obtaining the knowledge, and people to translate the knowledge for the purpose of applying it to the local situation. Acceptable innovation should be derived from the best theory, related research findings and appropriate methodology.

On the right side of the model is knowledge of the educational setting. Only recently have we come to understand that every educational institution, every school system, every college and university is a unique organism and therefore we should probably use the word "adapting" rather than "adopting." You can never adopt in-total any kind of new idea in an educational institution. It always has to be modified and adapted to a local setting and environment while considering the priority of needs, the availability of resources, and the existing related innovations. A school which can't afford to employ specialists as consultants is going to have a difficult time making changes on its own. When you begin to innovate and adopt you have to have a lot of human resources available to do it. If you don't have the technology to support the innovatio you had better proceed cautiously. The process of change requires a feeding in of resources, theory, and resources, followed by local adaptions.

Now let us move for just a moment to what is happening currentl in education. For some time vocational education has been involved in planned change. One of the major developments occurring right now is the activation of eleven regional laboratories under federal funding. Under the ESEA, Title 4, there is roughly 75 million dollars which has been set aside for the activation of these laboratories. The purpose of the laboratory is for the precise purposes presented above. It is to take the accumulated knowledge which we have about educational practice and attempt to find the ways of applying such knowledge to school systems in the area served by the laboratory. The Kansas City laboratory (MCREL) is one which is investing a generous amount of money into information storage and retrieval. It will have an extensive computer complex in order to provide basic information. Second, it will have access to ERIC.

In the other direction, the laboratory will attempt to work wit individual school systems. Many of us hope that every school in the region of a laboratory will become a member and involved in research activities. The laboratory is designed to be the link between basic research information and field testing in schools. The system we are activating in education is clearly built on the agricultural dissemination model. We don't know if the scheme will be successful because education is organized quite differently from agriculture. As a consequence we are likely going to have some difficulties in applying what we know about innovation in agriculture to educational systems. During the next three or four years we should be able to determine whether this was a good bet or whether we should have attempted entirely new models in education which departed dramatically from anything we now know in medicine, agriculture or other fields. The significant fact is that attention is being given to projecting and testing various innovation models to see which will prove to be successful when applied to education.

THE ROLE OF THE RESEARCH COORDINATING UNIT IN VOCATIONAL EDUCATION

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University of Nebraska

I would like to change the title of my paper from "The Role of the Research Coordinating Unit in Agriculture Education" to "The Role of the Research Coordinating Unit in Vocational Education."

There are four questions which I will attempt to answer this afternoon.

(1) What is the Research Coordinating Unit?

(2) What are its objectives?

(3) What role does it play in Vocational Education?

(4) A brief summary in which I would express my personal opinions, as a result of some one year's work as Director of Operations and Coordinator of the Research Coordinating Unit for Nebraska Occupational Needs.

The Research Coordinating Units which up to approximately 2 or 3 months ago numbered 24 in the Nation, and now as I understand from rumors, number 48, were established as the result of the Occupational and Research Planning Program developed by the U.S. Office of Education. The program was authorized by the 1963 Vocational Education Act, Title (4C).

The Occupational Research and Planning Program supports a broad spectrum of research and development projects designed to help present and prospective members of the labor force to acquire basic knowledge, skills, and characteristics necessary to contribute to the Nation's economic progress. The three categories of projects are research, training, and experimental-developmental-pilot. Although there are different criteria for each type, all projects are evaluated in terms of: (1) significance or generalizability, (2) soundness of the research design or plan of operation, (3) adequacy of the personnel and facilities, (4) economic efficiency of the project.

Projects may deal with any age level from pre-school through adult and with preparation for any occupation requiring less than a bachelor degree. Special emphasis is given to the academically and socially economically handicapped. The program focuses on three major areas: (1) employment opportunities, (jobs); (2) human resources,(people); (3) educational development, (content, organization, and methods.)

The program is interdisciplinary in its approach to these areas since, in addition to vocational and general education, it involves such social sciences as Psychology, Sociology, Economics and Political Science.

The program allows grants or contracts to be made with colleges and universities, other public or non-profit private agencies and institutions, State boards of vocational education, and local education agencies (with concurrence of the State board). The Act reserves ten percent of all vocational education appropriations for the program. The latest AVA Report shows a possible increase in appropriations for the coming year.

As I see the Research Coordinating Unit for Occupational Needs, it has three major goals: (1) that of stimulating research in occupational education; (2) consultation with those interested in development of research and development proposals in occupational education and(3) the dissemination of research findings. The U.S. Office of Education, with R.C.U. advisory representation from the states, has developed broad objectives for Research Coordinating Units. These are:

1. Build an atmosphere within a state that commits itself to research and is receptive to it-especially with state staff, school leaders-legislators.
2. Stimulate projects, ideas and understanding of research.
3. Provide leadership in research related activities... seminars, conferences.
4. Coordinate state education research efforts in state agency and with other state government and professional agencies and professions.
5. Serve as consultants on research ideas and projects that forward vocational education.
6. Disseminate research information that enables others to utilize recent research findings.
7. Identify Research Training needs and personnel.
8. Work toward the identification of basic issues and problems needing research.
9. Develop long range plans for research.
10. Gather or assist in gathering needed data for a potentially computer based system of educational information.
11. Work closely with R&D Center, Projects and U.S. Office of Education personnel in coordination of total research effort.

Each state which has had an R.C.U. in operation has creatively attempted to meet the objectives. The Nebraska Research Coordinating Unit has seriously considered its role in vocational education research and development and has come up with these purposes for its existence.

Previous studies in Nebraska demonstrated the need for a more concerted and frontal attack on the problems related to manpower resources, needs and occupational trends. They indicated a need for a more formal development of a system by which the data could be translated into improved programs of vocational and technical education. They indicated a need for current and projected occupational and community data to be translated into future predictions of educational needs for gainful employment. They have shown and recognized the desirability that the products of the proposed research and development program should have ramifications and utilities beyond the boundaries of Nebraska. The Nebraska Research Coordinating Unit has recognized these problems and suggests that research development programs be planned on a long-range basis, and that a fundamental purpose of each program should be to initiate ongoing programs of research and development related to maximum utilization of available information and trends in vocational and technical education programs at state and local levels. It also focuses on minimizing the time lag in the nature and structure of the labor force and the needs of the persons employed in or planning to enter the labor force. Therefore, the following purposes were proposed for the Nebraska Research Coordinating Unit for Occupational Needs:

1. To develop a system by which national, state and local occupational information data may be coordinated, marshalled, synthesized, and interpreted and translated in terms of state and local programs of vocational and technical education.
2. To explore the possibilities of developing a statistical model by which state and local projections of occupational opportunities, employment trends, and educational programs could be made.
3. To develop procedures for maximizing information to local school corporations and minimizing the time lag between shifts of the occupational structure, opportunities for entry into the labor force, and needs for retraining.
4. To develop improved techniques of communications to local school corporations and of facilitating their use of the data and information in planning and modifying programs of vocational and technical education.
5. To develop improved techniques and procedures of collecting data at the local level.
6. To explore the possibility of developing a computer program technique for relating manpower needs to vocational and technical programs.

One of the major roles which the Research Coordinating Unit in Nebraska has played in vocational education is the bridging of the communication gap between vocational education agencies and other agencies, specifically under the leadership of the originator of the R.C.U., Mr. Cecil Stanley, Assistant Commissioner for Vocational Education, State Department of Education, and Dr. Floyd Miller, the Commissioner of Education, State of Nebraska. The Research Coordinating Unit was instrumental in coordinating the efforts of the Department of Labor, State of Nebraska, and its Employment Security Office and the Experiment Station of the Agriculture and Home Economics College at the University of Nebraska. The Commissioner of Labor allowed a leave of absence to one of his key men to serve on the R.C.U. staff. The College of Agriculture and Home Economics, through the Agriculture Experiment Station, agreed to house and administer the Research Coordinating Unit through the Department of Agricultural Education. These three agencies united to focus on one of the pressing problems of our time.

The Research Coordinating Unit, during the past year, has indirectly or directly made contact with and worked together with approximately 21 agencies within the State of Nebraska in pulling together resources to attain the objectives it had previously outlined. The Nebraska Research and Coordinating Unit is now recognized as a leader with regard to the consolidation and coordination of a system of occupational and educational information from which projections for occupational programs may be based and through which research may be facilitated.

Our interest in obtaining pupil enrollment data on which to base projections for the need for vocational and technical education, especially at the post high school level, has led us to work in direct working relationship with the State Department of Education. This data has been transcribed to magnetic tapes and, in essence, is the beginning of the computerized program which we have talked about before. Our efforts have gained widespread interest from such agencies as the Higher Facilities Educational Commission, the Special Education Department and the Director of Certification, as well as the Division of Vocational Education.

Due to our interest in pupil enrollments and our interest in computerized reports and projections, the Research Coordinating Unit has subcontracted with Nebraska State Department of Education and the State Department of Public Instruction of Iowa, on a project entitled, "The Development of a Total Integrated Educational Information System Compatible Among the Midwestern States" which is being administered by the State of Iowa.

The State Department of Labor has been concerned about the possibilities of maximizing the utilization of data collected within their department in the public school system. This concern was shared by us in the development of our original proposal. Our interest in educational service units in the State of Nebraska has culminated in direct service to Area 17 in Northwest Nebraska, enabling us to work extensively with the Directors of Title III of the Elementary Secondary Education Act and Project Directors at Alliance, Nebraska, not only in developing their total program but more specifically in assisting them to develop the vocational education program in this area.

We have consulted with the school boards in the State regarding developmental programs in vocational and technical education. More specifically, the Alliance schools at Alliance, Nebraska have asked for, and have received, assistance from the Research Coordinating Unit. As a result of our services, the Alliance school boards have been granted $80,000 by the State Board for Vocational Education for the construction of a vocational education building under the area vocational education section of the Vocational Educational Act of 1963. We have also facilitated the cooperation of the Alliance school with the modular scheduling project being conducted at Stanford University so that the flexible building under contract will be integrated with a flexible programming for vocational and technical education.

We have attempted not to deviate in principle from the objectives of the original proposals. However, our experience during the past year has led us to expand the base of our frame of operation. Many of the problems with which we are concerned are attacked from the totality of the educational enterprise in the state. The broader base which we have established has enabled us to cooperate effectively with other agencies and at the same time to develop models from which we may render a specific service to vocational education. We are now concerned with the coordination of efforts which will produce data information and the products of research which will facilitate the decision making process as it relates to vocational and technical education at the state and local levels. We believe that we have an obligation to assume the leadership for the development of, or the stimulation of programs of research which not only affect the operation of programs, but also the policy under which these programs operate. It is here that we refer specifically to the legislative aspects of the programs for vocational and technical education. We have discussed the program with the chairman of the Education Committee of the State Legislature and with the chairman of the Budget Committee. We proceed with the assumption that our responsibility is that of developing and testing out the system for projecting needs for vocational and technical education correlated with the other aspects of the educational enterprise, anticipating that if the system is developed adequately, state support will be forthcoming.

It is at this point that the model being developed by Dr. Ronald Wykstra, a member of the R.C.U. Economics Section, is assuming significant proportions. Dr. Wykstra finds that, compared with other states in the nation, Nebraska is a strong agricultural state but the proportion of the labor force employed in production agriculture has declined from approximately 50% at the turn of the century to approximately 20% at present. Net out-migration has been high in Nebraska industrially; industrialization in the State has not kept pace with the nation in utilizing human resources released by the expanding agricultural technology. Interest in post-high school programs of vocational and technical education is increasing and it is hoped that the full and complete development of the models will provide the necessary information to demonstrate that investments in vocational and technical education will have the effect of increasing per capita and total income. But, a two-prong attack is needed: one toward investments and human capital resources, and the second toward the investments of state resources in natural resource development together with industrial and commercial development.

With the preliminary work in economic research rapidly drawing to a close, we are confident that we are in a position to stimulate additional work which will enable us to utilize data from the Department of Labor and other sources to depict the status of the structure of the labor force. We hope to address research efforts to study needed changes in the structures, changes which are needed to produce increments in total income and per capita income. Preliminary evidence would indicate that Nebraska is typical of the mid-plains states in that unemployment is relatively low but under-employment is a real problem in the state. Training is needed to up-grade the general levels of skills. An effort is needed to attract industries which will utilize the human resources available in the state. The total problem has real social implications since out-migration is highest among the child-bearing age groups.

Our original interest in the investigation of computer technology to resolve the problems of occupational information is showing results. Unlike the larger more popular states the resources for the use of computers is somewhat restricted in Nebraska. Many small school districts cannot afford the installation of a computer service. At the same time the resources of the University of Nebraska Computer Center have been expanded to include a 7040 complex soon to be enlarged to a 360 series. Our unit is paving the way for increased efficiency through the computerization of the State Department reports, including the Division of Vocational Education, and, at the same time, possibilities for joint efforts are becoming increasingly evident.

Our Research Coordinating Unit staff have assisted with and/or consulted on two major research projects underway at the University of Nebraska. (1) "The Development of Materials for the Orientation of School Administrators in Vocational Education," and (2) "The Identification of Common Behaviorly Oriented Factors as Basis for the Pre-entry of Preparation of Workers." The latter project being conducted jointly by the Colorado State University and the University of Nebraska. We have also been instrumental in arranging the meetings or assisted in arranging the meetings having to do with the possibilities of concerted effort in the study of State Departments of Vocational Education now under way at the University of California, Berkeley.

In the area of research development the Research Coordinating Unit has assisted in developing a project of the Agricultural Experiment Stations entitled, "The Anatomy of Decision Making as it Relates to Educational and Occupational Choices of Rural Youth." This project has been approved by the Director of the Co-operative State Research Service of the U.S. Department of Agriculture.

We have also worked closely with the Nebraska Vocational-Technical School at Milford, Nebraska, in encouraging and assisting with the preparation of a proposal to develop a course of study in diesel technology which has been submitted and to this date, I assume, approved, to the Division of Vocational and Technical Education of the U.S. Office of Education.

Members of our staff have been working on an initial proposal for research dealing with both high school agriculture programs.

Another member of our staff has been developing a proposal dealing with the use of the semantic differential technique for the assessment of attitude toward vocational education. Another has been working on a proposal dealing with the assessment of the role of mothers as change agents in changing levels of occupational and educational aspirations. We have worked in close cooperation on a guidance evaluation project through the Lincoln school board, and the project has been modified in light of recent writings dealing with the development of paradigms for the decision-making process in guidance. Attempts are being made at the present time to develop a proposal with personnel at the Nebraska Vocational-Technical School at Milford, with regard to the possibilities of adapting the model for motivation developed by members of the Educational Psychology and Measurements Department. It would appear that this project may be developed for application both at the Milford school and at the newly formed University of Nebraska School of Technical Agriculture located at Curtis. We have consulted with personnel in the Agricultural Extension Service regarding a project dealing with Adult Education.

In the way of progress on dissemination we have conducted and initiated reports to the Nebraska Inter-State Compact Commission, the Nebraska Chapter of the National Personnel and Guidance Association and to members of the Governer's Commission on Education.

As previously pointed out, the direction which each of the states and R.C.U.'s take will be different; however, I have tried to describe in some detail the role that an R.C.U. might play in Vocational Education. Its implications to Agricultural Education are obvious. However, due to the very nature of the intent of Congress in its passage in the 1963 Vocational Educational Act, it is the responsibility of the Research Coordinating Units to consider all areas of vocational education.

In summary, I would like to point out that I have tried to present something of an insight into the Research Coordinating Units for Occupational Needs, their reason for existence, their objectives, and the röle that they might play in occupational education.

Every step possible has been taken to assure that the work of the unit will be coordinated with the interests of the Division of Vocational Education of the State Department of Education to the extent that the Assistant Commissioner for Vocational Education is chairman of the advisory committee and a co-initiator of the R.C.U.

And so you see how the Nebraska Research Coordinating Unit in Occupational Education has emerged as the research leadership in occupational education within the State. As time progresses, stories such as ours will be told across the nation. It is hoped that within a short time, the successes of each will be amalgamated into an occupational research program that will be beneficial in the ultimate end to each and every boy and girl within our local states so that they might have the opportunity to prepare themselves for the opportunities which are available without a college degree.

The challenge as I see it, is to have a staff and director who can empathize with every discipline concerned with occupational preparation, choice and needs, and then marshall their resources to assist those in need.

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COMMITTEE REPORTS

Committee Report on

RESEARCH DESIGN AND DEVELOPMENT

Chairman - Forrest Bear
Carlton Johnson
Consultant - Douglas Sjogren

Committee

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William Bigham
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Project:

The development of a student-centered curriculum in agricultural occupations other than farming at the high school level.

Rationale:

1. Not all students will be farm operators
2. There are many jobs in agriculture other than farming
3. The work force is approximately 20% professional and 80% other
4. There are fewer jobs for unskilled workers
5. Population shifts are great because of lack of training
6. Such a program would utilize the agricultural and rural background of students
7. The vocational agricultural program is a successful organized and on-going program with personnel competent in working with rural students
8. High school has a rather complete cross-section of students rather than a selected student body such as is found in all post high school programs

The Objectives of the Study are the Development of a Curriculum:

1. To meet student needs based on a determination of
    - a. The students competency level in agriculture
    - b. The students interest in agricultural occupations
    - c. The students aptitude
2. To provide instruction in agricultural occupations which will lead to any one of the following:
    - a. Occupational exploration
    - b. Immediate job entry
    - c. Technical training for a closely related area following high school
    - d. Professional training in agriculture in college
3. To provide for occupational experience related to, and enriching the classroom instruction
4. To improve interpersonal relationships
5. To provide instructional units in agricultural occupations

Committee Report on
Dissemination and Adoption of Research Results

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Dr. Kenneth Shibata

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Myron Schoch

Guidelines For Dissemination of Research

1. Regular and systematic channels of communication for dissemination must be open.

2. Channels should be flexible so that all groups may be reached.

3. The receivers must be trained in the use of the information communicated.

4. Put information into the dissemination process at all appropriate levels.

    - disseminators
    - teacher educators
    - state supervisors
    - teachers

5. Put information into the dissemination process employing all appropriate methods.

    - personal contacts to teachers
    - provide abstracts of research to state officers, teachers, etc.
    - disseminate reports as well
    - E. T. V.
    - R. C. U.
    - Ag. Ed. Magazine

6. The information should be in a language that is understandable and useable by the reciever.

7. Communication to be open both up and down the channels.

8. The information needs to be gathered and reported with some uniformity.

9. The information should be gotten to the receiver as quickly as possible.

10. Vocational educators should become familiar with the models describing innovation, dissemination and adoption processes.

Guidelines For Adoption of Research Results

1. A special function of the teacher education and state supervisory staffs is to act as change agents.

2. Pilot centers and demonstration centers are important aspects of the adoption process. Outside support and help in evaluation needs to be provided.

3. Constant evaluation is needed of the adoption so that the innovation stays a means rather than an end in itself.

4. The receivers need to go through the total process of adoption and it must be compatable with their expectation.

5. The adoption will take place when the persons involved can see a relative advantage.

6. The adoption idea should be kept simple.

7. To encourage continued adoption, the results must be easily recognized and visable.

8. The results of adoption should be communicated back into the channels.

Specific Recommendations

1. Encourage greater use of the research in progress section of the Ag. Ed. Magazine.

2. Teacher educators should include dissemination and adoption information as well as research materials and methods in undergraduate teaching.

3. **Research Coordinating Units should cross state lines.**
4. **The research conferences should be continued.**
5. **C.R.R. Conference participants should investigate the possibility of establishing an intra-state WATS line.**
6. **Use WATS and ETV for dissemination of information.**
7. **Ag. Ed. should support the use of ETV.**
8. **A representative of the State Vo. Ag. Association have contact with the R.C.U.**
9. **Application and use of the research efforts to be disseminated to all teachers.**
10. **High school teachers should identify dissemination, adoption and research processes with their classes.**
11. **An exchange of research results among the various educational services and ag. agencies in each state.**
12. **Devote a portion of state ag. conferences to the dissemination of research pertinent to ag. teachers.**

Committee Report on

Evaluation of Research

Chairman - Richard Wilson

Consultant - Dr. Virgil Christiansen

Committee

Don Benson	Glen Nicklas
Tom Brubaker	James Pollan
Herbert Bruce	John Rolloff
Harold Crawford	Ed Stitch
George Ekstrom	U. E. Wendorff
Stan Elsen	Eugene Wood
Willis Luedke	Tom Mattson
Marian McCreight	Ralph Hansen

The evaluation committee felt it should develop objectives and guidelines that could be used in evaluation of the design, dissemination, and adoption of research results.

The committee also felt that the vocational agriculture program should be evaluated on more than numbers in the program. We also should be concerned about the number of students moving into jobs and the number advancing toward an occupational objective.

Objectives and Guidelines to consider in our evaluation:

1. To train for gainful employment -
    a. The number moving toward gainful employment in an agricultural occupation should be counted as meeting the first objective.
    b. Students (vocational agriculture) who enter the armed forces at the end of the training period are included as employable in the agricultural occupations.
    c. Students going into advanced training in agriculture are considered to be moving toward an agricultural objective.
2. The curriculum for training personnel for gainful employment should include all the clusters in the broad field of agriculture.
    a. Use the program before 1963 as a benchmark for evaluation.
    b. Changes made to train for the broad field of agriculture will be considered as an innovation.

c. Consideration should be given to train teachers and up-grade those already teaching.

  - pre-service
  - in-service

d. Educational programs should be offered by teachers with specialties

e. New programs should be offered in terms of student needs determined by research in the states.

  - offer training in as many clusters in the broad field of agriculture as needed.

f. Consideration should be given to the establishment of programs of continuing education in specific fields of training.

  - Post-high school
  - High school
  - Young farmer
  - Adult farmer

g. Establish experience programs based on the occupational goals of the students.

3. Curriculum in agricultural education should be developed to provide education for people with special needs.

a. Consideration should be given to provisions for individual instruction.

4. (Effective use is made of youth organizations in the training program.)

a. Consideration is given to the extent to which all students in vocational agriculture are involved in the program.

b. Evidence given to leadership developed.

c. Other objectives as stated in the FFA Manual.

We have written our report in the form of objectives, but these objectives are evaluation objectives. The committee does not feel that these objectives are all inclusive. Others should be considered in our evaluation.

REPORT ON GRADUATE STUDENT'S RESEARCH

VOCATIONAL COMPETENCIES AND THE LOCI OF INSTRUCTION FOR THE PERFORMANCE OF THE SALES FUNCTION IN THE FEED INDUSTRY[1]

James J. Albracht

This is a report of a study to determine the vocational competencies for the performance of essential activities for sales personnel in the feed industry, and the loci[2] at which the competencies could be taught. In previous research conducted by Clark[3] of the Michigan State University, twenty-eight activities were identified as being necessary for the performance of the sales function in the feed industry. Of the twenty-eight activities, the nine most important activities as rated by a feed industry jury of twelve experts were selected for this study. The nine activities had an average score of 3.5 or more when a five point scale was used: 0 - not needed; 1 - little importance; 2 - some importance; 3 - very important; and 4 - essential.

The author developed an interview instrument which included sixty-two competencies which might be considered essential for the performance of the nine sales activities. After consulting with university and feed industry personnel who were knowledgeable in the performance of the sales function in the feed industry, and after pre-testing the instrument by personal interviews with other feed industry and educator personnel the number of competencies were reduced from sixty-two to forty.

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[1] Adapted from Albracht, James J., A Process for Determining Vocational Competencies for the Performance of Essential Activities for Sales Personnel in the Feed Industry, and the Loci at Which the Competencie Could Be Taught. E. Lansing, Mich., Michigan State University, June 1966. This study was supported by a grant from the U.S. Office of Education, Contract No. OE-6-85-014, under provisions of section 4 (c), of the Vocational Education Act of 1963.

[2] Loci - The educational facilities where the sales competencies could be taught as indicated by time and place considerations.

[3] Clark, Raymond, Vocational Competencies Needed by Workers in Non-Farm Agricultural Occupations. E. Lansing, Mich., Michigan State University, June 1964 (mimeo).

A jury of twenty-four experts was selected and interviewed, with six representatives from each of four sub areas: feed dealers; sales training directors; agricultural education researchers; and business education researchers. The jury members were asked to make yes or no determinations for the forty competencies for the performance of each of the nine sales activities. Therefore, each of the forty competencies could have a total competency frequency of 216 (9 x 24) if each of the twenty-four jury members indicated that the forty competencies were essential. The competency frequencies are listed in Table I.

TABLE I

Importance of Forty Competencies for the Performance of Nine Essential Activities by Sales Personnel in the Feed Industry as Rated by a Jury of Twenty-Four Experts

	Competency	Competency Frequency
25.	Thoroughly understands his company's feed products	201
29.	Understands the importance of personal sales traits and a pleasing personality	185
30.	Ability to greet customers and study their needs	185
5.	Understands feeding practices and programs used in the community	184
31.	Ability to classify and cope with different types of customers	182
32.	Ability to use suggestive selling and to close the sale	179
36.	Understands the research findings of livestock (poultry) feeding trials	178
4.	Ability to determine rations for specific livestock (poultry) uses	177
2.	Understands the composition of farm grains, roughages, and supplements	174
26.	Understands other products sold by his business (company)	171

3.	Understands the various methods of preparing livestock (poultry) feeds, i.e., grinding, pelleting, etc.	168
15.	Understands the control of livestock (poultry) pests and parasites	165
20.	Ability to determine the approximate amount of profit that is likely	165
24.	Understands the policies of his business (company)	164
9.	Ability to determine the livestock (poultry) performance records to keep	162
14.	Ability to identify common livestock (poultry) diseases	159
27.	Knowledge of the feed products of competitors	158
33.	Knowledge of feed mill operation	156
17.	Ability to evaluate farmer's roughages, pasture, and grain resources	152
22.	Ability to determine the repayment ability of the customer	152
1.	Knowledge of the physical make-up and digestive process of farm animals (birds)	150
35.	Ability to write up and interpret the feeding results of his customers and convey them to management	149
13.	Understands the place of sanitation in the livestock (poultry) operation	148
21.	Ability to determine with the customer the amount of credit needed	148
40.	Understands the promotional techniques for increasing feed sales	148
37.	Ability to express feeding and nutrition information to groups	147
7.	Understands the factors to consider in selecting specific animals (birds)	145
18.	Knowledge of livestock prices and price trends	145
34.	Knowledge of transportation and delivery procedures	145
12.	Understands the influence of equipment upon growth and the rate of gain	144

11.	Understands the influence of housing upon the growth and rate of gain	144
28.	Ability to fill out company invoices and sales contracts	136
6.	Knowledge of the agricultural practices used in the community	130
10.	Understands the influence of heredity on the rate of gain	126
16.	Ability to fit animals for show or sale	123
39.	Understands the problems of feed dealers in the community	122
19.	Knowledge of marketing channels for livestock (poultry) and their products	118
8.	Ability to determine the grade of the animals (birds)	109
23.	Knowledge of the methods used in collecting bills	107
38.	Understands the criteria for appraising prospective feed dealers	89

The number of competencies which were considered to be essential for the performance of each of nine activities are: sells direct to producer, 39; assists local dealers in promoting the use of specific feeds, 38; assists farmers in planning feeding programs, 37; assists local dealers in promotional campaign and feed and grain clinics, 37; assists farmers to see through their own problems, 36; follows up on results obtained by customers and reports them to management, 36; sells to customer across the counter, 36; recognizes abnormal and detrimental practices and animal health conditions, 31; and solicits local dealers to sell company products, 27.

The jury of twenty-four experts were also asked to indicate at which loci each of the competencies could be taught. The number of competencies which could be taught at each of the six loci were:

dealer or company school, 40; on-the-job[4], 40; post high school, 33; adult, 32; four year college, 31; high school, 28.

Of the forty competencies, seven were considered to be specifically related to the particular feed company, and the jury members indicated that these seven competencies could only be taught at the "dealer" and the "on-the-job" loci. The seven competencies were: thoroughly understands his company's feed products; understands other products sold by his business (company); understands the policies of his business (company); knowledge of the feed products of competitors; ability to fill out company invoices and sales contracts; understands the problem of feed dealers in the community; and understands the criteria for appraising prospective feed dealers. Of the remaining thirty-three competencies the jury members considered that each of the competencies could be taught at the "post high school" locus, and that twenty-eight of the thirty-three competencies could be taught at the "high school" locus.

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[4] On-the-job - Any training given to personnel who perform sales activities in the place of business exclusive of that given in cooperative occupational programs between the employer and on educational institution.

SOURCE AND EXTENT OF ECONOMIC COMMITMENTS TO PUBLIC VOCATIONAL EDUCATION IN MINNESOTA AND THEIR EFFECTS ON THE NATURE OF TRAINING OPPORTUNITIES

Clifford L. Nelson
University of Minnesota, 1966

Major Advisor: Milo J. Peterson, Ph.D.

Purposes

1. To examine the economic commitment to public vocational education in Minnesota comprehensive high schools prior to passage of the Morse-Perkins Act of 1963.
2. Determine which economic factors contribute significantly to type and level of vocational education offerings.
3. To examine the effect of varying levels of economic support and school size on the relative number of vocational education opportunities in individual Minnesota school districts.
4. To examine the enrollees in vocational education classes in terms of their academic aptitude and academic achievement and the relationship between these factors and the economic measures and school size for individual school districts.

Procedures

All public high schools in Minnesota for the 1963-1964 school year were surveyed. Sufficient data were available from 444 school districts out of 453 to be included in this study. The following data were gathered on the individual schools: secondary enrollment, pupil unit enrollment, adjusted assessed valuation per pupil unit; total enrollment in all vocational education and in vocational agriculture, distributive education, home economics and trade and industrial education; total expenditure for all vocational education and for vocational agriculture, home economics, distributive education and trade and industrial education; also total reimbursement for all vocational education and for vocational agriculture, home economics, distributive education and trade and industrial education. Also computed for each school was a vocational enroll-ratio which was the percentage of all secondary students in each school enrolled in vocational courses.

A population stratified sample of 31 schools was selected for further study. All seniors enrolled in vocational agriculture and distributive education were examined in terms of their Minnesota Scholastic Aptitude Test scores, Cooperative English Test scores, and high school rank percentiles.

The data were analyzed with descriptive statistics and with multiple correlation and multiple regression techniques. Correlations and multiple correlations were tested for significance. Variables were dropped from consideration when their continued inclusion did not add appreciably to the findings.

Findings

1. Large wealth variations, in terms of adjusted assessed valuation per pupil, were found among school districts. A range from $1, 868 to $22,341 was found.
2. The data indicated a significant positive relationship between adjusted assessed valuation and vocational enrollment ratio, thus indicating that wealthier districts offer relatively more vocational training opportunities.
3. School district wealth was independent of school size.

4. School district size was highly significantly related in a negative direction to the vocational enrollment ratio indicating that smaller school districts offer relatively more vocational education opportunity.

5. Vocational agriculture offerings had a highly significant positive relationship with the vocational enrollment ratio.

6. Senior students enrolled in vocational courses had uniformly lower aptitude scores in MSAT and English when compared to all Minnesota seniors.

7. Senior students enrolled in vocational courses achieved at close to average levels when compared to all Minnesota seniors.

8. Student aptitude and achievement were independent of economic and enrollment variables.

Implications and Recommendations

1. The findings suggest that examination of economic and student variables might be an appropriate approach to evaluation of vocational education.

2. Study should be given to allocation of federal funds to local school districts on equalization basis for vocational education.

3. Follow-up study should be made of the impact of the Morse-Perkins Act.

4. Subsequent studies should not be limited to high school offerings of vocational education. Examination of post high and area vocational school offerings should be made.

5. More extensive use of economic variables might be used to advantage in subsequent investigations.

SUMMARY

EDUCATIONAL RESTRICTIONS TO AGRICULTURAL SUCCESS AND THE RELATIONSHIP OF EDUCATION TO INCOME AMONG FARMERS

By
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Cooperative Research Project Number 2604
July 1964 - July 1966

BACKGROUND

Production agriculture is an occupation that is characterized by high investments in physical capital, high risks, and irreversible decisions of occupational choice. While much attention has been focused on the economic inputs in production agriculture, few attempts have been made to assess the value and impact of the educational inputs on the deployment of the other resources. No tools have been found to predict the future success of the young man prepared to enter farming nor to provide guidance for the itinerary necessary to lead toward success.

The ability to describe the micro-economic response of a slow growth industry such as agriculture to educational inputs should have value for other similar industries. The effects of the economic educational and biographical factors upon future success of the beginning farm operator should be an important consideration for other industries with similar problems of entrepreneurial establishment. In the broader sense, success must be examined in its effects upon the performance and intellectual development of the progeny of the industries workers.

OBJECTIVES

The three objectives of this study were:

1. To describe the conditions that assure successful entry into the business of farming.

   The conditions were in terms of the economic, educational and biographical factors possessed by the farmer at the time of his entry into the farm business. Success was defined by the criterion measures gross income, net income and yearly gain in net worth.

2. To further define the effects of the educational components on successful entry into the farm business by considering the independent effects of each of the measures of the educational component in relation to the criterion measures of farm success.
3. To determine the relationship between the success of the farm business and the aptitude and school achievement of farm children.

PROCEDURES

The sample was drawn from among the farmers who had participated in institutional on-farm training following World War II. Only those who were trained under the auspices of Public Law 346 and Public Law 16 were selected. All schools which formerly conducted veterans training classes and which still maintained a department of vocational agriculture, were surveyed to determine the availability of training which would describe the economic, educational and biographical status of the veteran at the time he commenced farming. All veterans who had attended training classes in agriculture in forty of the forty-three schools, which affirmed the availability of training data, were part of the original sample. The schools were distributed throughout the state in about the same proportion as the farm population. Schools represented areas having all of the major types of farming found in Minnesota.

Only those veterans who were still engaged in farming were used to test the hypotheses suggested in the objectives. Both vocational agriculture instructors and county Agriculture Stabilization

Committee Office Managers were asked to identify those men who were still engaged in farming. This procedure produced a list of 1,639 former veterans assumed to be farming who had attended institutional on-farm training at one of the 40 schools. Subsequent failure to locate all of these men by mail and by interview reduced the sample of those assumed to be farming to 1,307.

The training record of each veteran was searched for data on the economic resources utilized by the veteran at the time he began farming. These records were collected from the forty cooperating schools. A uniform accounting system had been used in all schools. Thus it was possible to collect data on fixed, working and total capital, liabilities, business size measured in acres and work units, and early farm income, as well as some of the data on the education and biographical status of the beginning farmer. Data on the educational component were drawn from training records, questionnaires and search of the service record files of the Military Services Personnel Records Section at St. Louis, Missouri.

To provide a measure of farm success, it was necessary to gather current data from each farmer. A questionnaire was prepared which asked for a list of the children by name and last grade attended, educational background of man and wife, investments of assets and liabilities and several income measures as reported on farm income tax records. The criterion measures, gross income, net income and gain in net worth, were derived from the economic data obtained from the questionnaire. Measures of income were taken from the income tax files of each farmer and were later adjusted to equalize the effects of capital gain income between farms. Yearly gain in net worth was obtained by dividing the difference in net worth at the beginning of institutional on-farm training and net worth as of January 1, 1965 by the number of years that had elapsed.

Those who did not respond to the mailed questionnaire were assigned to vocational agriculture instructors to be interviewed. Not all farmers assigned were interviewed. Some who were interviewed refused to respond with necessary data. This procedure resulted in an additional one hundred and sixty-five completed returns. University staff members interviewed an additional thirty-three farmers. While the interviewed group had a significantly higher net worth than those who responded by mail, no significant differences were evident between those interviewed and those who responded to the mailed questionnaire in terms of size of farm in acres, size in work units, gross income or net income.

The Military Services Personnel Records Section, St. Louis, Missouri provided the data on the General Classification Test and Mechanical Aptitude Test scores for all veterans for whom this data was available. As questionnaires were returned by mail and interview, the names of farmers' children in grade four and above were sent to their respective schools for information on intelligence and school achievement. The most prevalent measure of intelligence, the Lorge-Thorndike Intelligence Test, and the most prevalent achievement test score, the Iowa Test of Basic Skills were selected as measure of these intellectual attributes. The relationship of these measures to the three criterion measures of farm success was ascertained by employing the Pearsons Product Moment Correlation. A random sampling procedure, with replacement, was used to select two children from each family for which scores on the intelligence test or achievement test were available. The total sample, randomly selected, for testing the relationship of intelligence to measures of farm success contained two hundred and ninety children. The sample with achievement test scores contained two hundred and forty students.

The variable factors selected as predictors of farm success were: (1) age at beginning of training, (2) beginning tenure status, (3) total beginning capital, (4) size of business-work units, (5) number of years as farm operator, (6) months of I.O.F.T. completed, (7) size of business-tillable acres, (8) number of children, (9) highest school grade completed, (10) years of high school Vo-Ag., (11) G.C.T. score, (12) M.A.T. score, (13) ratio: total fixed capital/total beginning capital, (14) ratio: beginning net worth/ total beginning liability, (15) ratio: costs of veterans training/ total beginning capital and (16) number of adult classes attended in the past five years.

Because G.C.T. and M.A.T. scores were not available for all subjects, separate sub-samples of 210 subjects with G.C.T. scores and 116 subjects with both G.C.T. and M.A.T. scores were drawn to allow maximum use of data. The three sample groups were not statistically different from each other, except for the availability of the two test scores, and age of operator.

A multiple regression equation was formulated for each of the sample groups using in turn, the criterion measures of gross income, net income and yearly gain in net worth. Those variables which did not exhibit at least a low level of significance in the first equations were eliminated and the multiple regression equations recomputed with the variables remaining. Variables which had a t value in excess of the table .05 level were judged to be the significant variables in the prediction of the criterion measures.

The educational component was studied in more detail by the use of analysis of multiple covariance. Each measure of the education component, years of school completed, G.C.T. score, months I.O.F.T. and number of adult classes attended, was used in turn as the main effect while the influence of the remaining components was nullified by mathematical computation in the multiple covariance equation.

FINDINGS AND CONCLUSIONS

1. The multiple regression equation can predict about 25 to 30 per cent of the variation in gross incomes for established farmers, using as variables the factors which describe their educational, economic and biographical status at the time of entry into farming.
2. While a total of nine variables appears to be significant in the prediction of gross income, the five most significant are: (a) age at beginning of training (farming), (b) beginning tenure status, (c) total beginning capital, (d) number of adult classes attended during the past five years, and (e) Mechanical Aptitude Test score. Other variables which were significant in at least one of the three sample groups were (a) size of farm-tillable acres, (b) ratio: total fixed capital/total capital (c) ratio: beginning net worth/total beginning liability (d) ratio: training costs/total beginning capital.
3. Net income as reported for income tax purposes cannot be efficiently predicted by any combination of the sixteen variables studied.

4. Yearly gain in net worth is closely allied with gross income and is subject to prediction by some of the same variables. About 20 per cent of the variability can be explained by the independent variables studied.
5. The variables most significant for predicting yearly gain in net worth are: (a) age at beginning of training (farming), (b) total beginning capital, (c) size of business in tillable acres, (d) adult classes attended.
6. In the separate multiple covariance study of the education component the years of school completed was significantly related to farm success when success was measured in yearly gain in net worth.
7. Adult instruction is significantly related to farm success and is one of the means available to compensate in part for the lack of economic inputs.
8. There is no significant relationship between the various measures of farm business success for the farm parent, and the intelligence and/or achievement level of farm children.
9. Net income as reported for tax purposes, because of its low correlation with measures of financial progress, is not an appropriate measure of farm success.
10. In planning the itinerary of a beginning farmer, special attention should be given to the deployment of the economic resources and the availability of opportunity for continuing education.

A large part of the ability to predict the success of a young man about to enter the farm business is still closely bound in the "human factor" and made more obscure by the uncontrollable factors of markets and the whims of nature. Of significance, however, is the fact that some portion of this success can be predicted by those factors which are known at the time the itinerary to enter farming is planned. The important role of capital in this prediction emphasizes the necessity of careful deployment of this resource. Because farm size and tenure status are significant factors, those counseling young men about to farm should be particularly cognizant of the importance of improving the flexibility and manageability of the farm capital resource.

The suggestion of the substitution effect of education for some of the economic investments in the beginning farm business is an important finding of this study. It is possible that the need for high initial investment in farm capital can be effectively reduced if the itinerary of the beginning farmer includes more participation in formal education prior to farm establishment. Vocational agricultural study at the secondary level may culminate in enrollment in post-secondary programs designed for entry into production agriculture, rather than direct entry into the occupation.

The availability of a suitable training center for continuing post high school education in production agriculture following formal school education is a major consideration for the young men about to farm. The significance of this factor to farm success, and the possible outcomes of substitution of this factor for other success attributes in the beginning farming stages magnifies the importance of a sound program of adult and beginning farmer instruction in agriculture to the prosperity of the rural community. Young men who are planning to farm should consider this type of training opportunity an important prerequisite to continued financial success.

Likewise, communities faced with declining affluence of its rural population should give careful consideration to bolstering the probability of farm income improvement through the conduct of a sound program of adult and post high school education in production agriculture. Particular attention should be given to developing competencies in managing the human resources involved in decision making.

A careful evaluation is needed of the kinds of adult education programs now offered to beginning farmers to determine the type of program which provides maximum economic return to the educational inputs. It is likely that the most profitable program will be one that combines an intensive program of instruction for a limited period of time with long range continuing education.

Other industries which follow the same general patterns of business organization may find it worthwhile to examine the effects of the broad categories of variables, economic, educational and biographical upon success within their respective industries. It is possible that in industries marked by a preponderance of relatively small entrepreneurial establishments some of the same relationships shown for the agricultural sector may be found. Where management is a principal factor in individual success it may be worthwhile to reexamine the itinerary for business entry in more detail to determine the optimum deployment of resources.

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There are 14 references listed in the final report.

CAREER PATTERN ANALYSIS OF A
SELECTED GROUP OF FORMER
VOCATIONAL TEACHERS

Coop. Research Project S-458

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EAST LANSING, MICHIGAN
1966

CAREER PATTERN ANALYSIS OF A SELECTED GROUP OF FORMER VOCATIONAL TEACHERS

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MICHIGAN STATE UNIVERSITY
East Lansing, Michigan

Project Number: S-458*

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BACKGROUND

As a result of recent Congressional actions vocational education programs are being stimulated, and are rapidly expanding to provide vocational education to additional clientele. Obtaining an adequate supply of persons to implement the programs in vocational education that are being developed from the impetus provided through this recent Federal legislation will place additional demands on an already inadequate supply of vocational teachers.

A large group of qualified persons have had vocational teaching experience but are not currently teaching in vocational programs. Are these former teachers potential staff for vocational education programs? A review of literature did not reveal the critical choice points of their careers, nor did it reveal their career orientations or how they viewed teaching as a profession. Descriptive data about their careers is simply not available. A need, then, exists for an examination of the careers of former vocational teachers.

PURPOSES

The study sought to:

1. Discern those factors which contributed to the career development of a group of former vocational teachers.
2. Determine how this group of former vocational teachers relate to the current teacher shortage in vocational education.

PROCEDURE

The population were those persons who graduated from Michigan State University in 1952, 1956, 1958, 1960 and 1961 qualified to teach either agriculture, business or home economics; who began to teach vocational education immediately after college graduation; who taught for one or more years; but who were not teaching in the fall of 1965.

Longitudinal type career information was gathered in the following categories: (1) background and personal information, (2) career choice and educational history, (3) employment history, (4) work values, (5) teacher satisfaction, (6) reason for leaving teaching, (7) attitude toward re-entering vocational teaching, and (8) social mobility. Eighty-eight percent of the respondents returned the questionnaires which resulted in 205 (71 agriculture, 41 business and 93 home economics) careers of former vocational teachers being analyzed for the study. The analyses included the use of chi-square, Kruskal-Wallis One-Way Analysis Model, Spearman Rank Correlation Coefficient, Miller-Form Career Pattern Paradigm and descriptive career patterns.

SUMMARY OF FINDINGS

Background Information: The former vocational teachers were born to rural-farm or city parents. Former agriculture teachers were born to parents who were rural-farm residents; former home economics teachers to parents whose residence was rural-farm, rural non-farm and suburban; and the former business teachers' parents were city or suburban residents. A general shift from city to rural-farm occurred for over one-fourth of the former agriculture teachers during the time span from birth to high school attendance.

Mothers of the former vocational teachers had a median education level of 12 years, which was one year higher than the educational level of the fathers. Parents of former home economics teachers exhibited the highest level of educational attainment and the parents of former vocational agriculture teachers possessed the lowest level of educational attainment. Nearly two-thirds of the former teachers' parents were blue collar workers. The fathers' primary work for the three groups may be characterized as follows: former business teachers, white collar; former home economics teachers, equally divided between white and blue collar; and the former agriculture teachers, blue collar.

Employment History: Twenty-seven percent of these 205 former vocational teachers who started to teach immediately after college graduation exited at the end of their first year of teaching; 50 percent had exited by the end of two years of teaching; 62 percent after three years of teaching; 74 percent the fourth year, 83 percent the fifth year, etc. Note the numerical progression involved in the rate of exit of former vocational teachers.

	Accumulative Percent
Year 1 = 1/4	.250
Year 2 = 1/4	.500
Year 3 = 1/8	.625
Year 4 = 1/8	.750
Year 5 = 1/16	.812
Year 6 = 1/16	.875
Year 7 = 1/16	.937

The peak exit rates of the three groups of former vocational teachers did not occur at the same time. The largest percentage of exit occurred at the end of two years of teaching for former business and home economics teachers, while it occurred at the end of four years of teaching for former agriculture teachers. The majority of the former vocational teachers obtained all of their teaching experience in one school and 91 percent had experience in no more than two schools.

The final rank order of jobs taken as this group of former teachers exited vocational classroom teaching was: homemaking; business, sales and secretarial; professional; school administration; non-vocational classroom teaching; back to college; and military. The 1965 jobs held are in the same rank order, except that the professional category moves from third to fifth, while the categories back to college and military are eliminated.

The following observations were made about the respective exit rates and jobs taken for former agriculture, business and home economics teachers.

1. The exit for home economics teachers occurred earlier in their careers than it did in the careers of agriculture and business teachers.

2. The exit rate for business teachers was similar to that of the home economics teachers but occurred somewhat later.

3. The exit rate for agriculture teachers occurred at a slower rate than either home economics or business teachers.

4. About three-fourths of the former home economic teachers had exited by the end of their third year of teaching. This exit rate was reached by the business teachers at the end of their fourth year of teaching and by agriculture teachers during the sixth year of teaching.

5. Most home economics teachers exited to become homemakers.

6. Business teachers distributed themselves among business, sales or secretarial jobs; homemaking; or non-vocational classroom teaching as they exited. The variety of occupations that they entered was limited.

7. Most former agriculture teachers entered school administration; business, sales or secretarial work; and professional

jobs. They entered a wider range of occupations, in general, than did the former home economics and business teachers.

Career Choice and Educational History: Nearly all of the former vocational teachers chose teaching as an occupation for the rewards that it would offer them. The two primary sources of those rewards were physical and interpersonal. A much lower percent of the former business teachers chose teaching for the interpersonal rewards than did the former agriculture and home economics teachers. Forty-eight percent of the former business teachers chose teaching for the physical dimension of the job while this percentage was 17 and 31, respectively, for the former agriculture and home economics teachers. Among the former teachers whose parents had some education beyond high school, there existed some tendency to choose teaching for the physical rewards and among those whose parents had less than a high school education to choose teaching for the interpersonal rewards.

Teaching was the first occupational choice for 63 percent of the group, but only one-third of the former vocational teachers had decided to become a teacher by high school graduation. This was true for one-fourth of the men and 50 percent of the women. Fifty-four percent of the former home economics teachers, 24 percent of the former agriculture teachers and only 15 percent of the former business teachers had decided to become teachers by high school graduation. Former home economics teachers entered teacher education programs earlier than did former agriculture and business teachers.

The majority of the former vocational teachers acquired some education beyond the bachelor's degree. The differences between the areas of vocational education were highly significant on this variable. Former agriculture teachers sought this education earlier than did the other groups. The master's degree was completed by 56 percent of the former agriculture teachers but by only 18 percent of the former business teachers and by 14 percent of the former home economics teachers.

Work Values: Former vocational teachers were characterized as having high self-expression and people-oriented ideal job values and much lower extrinsic and other values. Former agriculture and home economics teachers had similar high self-expression and people-oriented values and low extrinsic and other values. Former business teachers possessed much higher extrinsic ideal job values. The former vocational teachers indicated that their people-oriented and self-expression ideal job values could be met in teaching, but their extrinsic and other values could not.

Social Status and Mobility: Only 12 percent of the former vocational teachers perceived their teacher social status as being below the social status of their parents while 46 percent perceived it as above their parents social status. Sixty-one percent of the former agriculture teachers, 34 percent of the former business teachers and 36 percent of the former home economics teachers perceived their teacher social status to be higher than that of their parents.

The lower the educational level of his parents the higher the former vocational teacher perceived his social status as a teacher. The same relationship was exhibited for respondents of blue collar families and those who had a rural residence during their formative years. The socio-economic status of those former vocational teachers who stayed in the job market as they exited teaching was not sex related. Educational attainment of the former teachers was related to their climbing in socio-economic status as they exited teaching.

Factors Related to the Miller-Form Career Patterns: These former vocational teachers who chose teaching for the interpersonal dimension of the occupation were equally likely to have a secure or an insecure career pattern, while those who chose teaching for the intellectual aspects exhibited a secure career pattern. The later the respondent decided to become a teacher (up to the third year of college) the more likely his career pattern would be characterized as secure. Former teachers with insecure career patterns were more likely to seek education beyond the bachelor's degree.

Former vocational teachers with education beyond the bachelor's degree were also likely to change jobs. The differences between the secure and the insecure career patterns in job satisfactions were not significant. However, those exhibiting an insecure career pattern were somewhat more satisfied with the extrinsic (such as salary) factors. This difference may be indicative of recent job changes by those classified as having an insecure career pattern. The ideal job values did not differentiate between the secure and the insecure career patterns. Those careerists with insecure patterns were twice as likely to have a positive attitude toward re-entering vocational education as were those holding the secure patterns. The most favorable re-entry attitude was possessed by those who had entered a secure phase of their career at one time but had recently (and currently) given up that job and had entered the trial phase on another job. This is insecure pattern, type 12.

Those with insecure career patterns would re-enter vocational teaching on a full-time basis and those with secure patterns would likely re-enter on a part-time basis, if at all. The insecure careerist was likely to indicate that he needed no refresher type courses if he re-entered vocational teaching. Former vocational teachers with secure career patterns would want pay equal to their present job, and the insecure careerist would want to be paid more than his present job.

The insecure careerist perceived his teaching social status as being higher than that of his parents, while the secure careerist viewed it as equal to or above his parents. The job taken as persons exit vocational teaching was likely to be higher than teaching in socio-economic status, if those persons had had an insecure career pattern.

Factors Related to the Descriptive Career Patterns: Five descriptive career patterns were also derived and titled: (1) family, (2) in-out, (3) horizontal, (4) vertical, and (5) cautious. The majority of those former vocational teachers with family and in-out patterns were born while their parents lived in a city and a majority of the vertical and cautious career pattern holders were born to rural-farm parents. Nearly two-thirds of those with a cautious career pattern had parents of less than high school education. Those former vocational teachers with family and in-out patterns (primarily women) chose teaching as an occupation for the physical and interpersonal dimensions, while the majority of those with vertical and cautious career patterns (primarily men) taught for the interpersonal dimensions of teaching. Only half of the persons characterized as having a family pattern, but 69 percent of the cautious careerists, decided to become a teacher while in college. The holders of vertical and cautious career patterns obtained a master's degree.

Those who exhibited vertical and cautious career patterns did not possess a positive attitude toward re-entering vocational education. Family and in-out career pattern holders would re-enter vocational teaching; would prefer a combination of in-service, refresher courses; and would want to be paid on the same level as present vocational teachers. Those former vocational teachers who disclosed vertical and cautious career patterns perceived their social status as a teacher to be quite a bit higher than that of their parents.

Attitude Toward Re-Entering Vocational Teaching: A positive attitude toward re-entering vocational education was held by 55 percent of the former vocational teachers. Thirty-three percent of the former vocational teachers indicated that they would consider re-entering vocational teaching on a full-time basis, 49 percent on some part-time basis, while only 18 percent would not re-enter on any basis. Former business and home economics teachers were much more willing to re-enter vocational teaching than were former agriculture teachers as 63, 61 and 41 percents of the respective groups had a positive attitude toward re-entering vocational teaching.

Nearly all of the respondents would prefer a classroom position if they re-entered vocational teaching. Forty-two percent of the former vocational teachers indicated that they would need technical subject matter courses if they re-entered, while 18 percent thought they would not need any type of in-service, refresher courses. About half of the respondents were never supervised by a vocational supervisor and the other half were supervised about two times a year. Eighty-one percent of the former agriculture teachers, 52 percent of the former home economics teachers, but only 15 percent of the business teachers were ever supervised by a vocational supervisor. In spite of the acknowledgement of such little supervision, nearly two-thirds of all respondents would want the same amount of supervision if they re-entered vocational teaching.

If they re-entered vocational teaching, former vocational teachers would expect to be paid at a rate equal to present vocational teachers, and men would want pay equal to their present job.

The two sections immediately preceeding this section of the report indicate that:

1. Those former vocational teachers with an insecure career pattern would re-enter vocational teaching on a full-time basis and those with a secure pattern would likely re-enter on a part-time basis, if at all.

2. Those former vocational teachers who exhibited vertical and cautious career patterns (primarily men) did not possess a positive attitude toward re-entering vocational teaching.

It would appear, then, that former vocational teachers may be regarded as a major source of staff for vocational programs on some part-time basis but not on a full-time basis.

Those respondents possessing a negative attitude toward reentry to vocational teaching are not restricted to one area of vocational education, though the former agriculture teachers possessed the attitude to the greater extent. They appear to be affected by a variety of factors which make up a "life pattern." Those possessing a negative attitude toward re-entering vocational teaching were shown: (1) to have low parental educational attainment, (2) rural residence during phases of their formative years, (3) blue collar work by the father, and (4) perceived teacher social status as being higher than parental social status. This group of respondents showed less frequent job changes than did the other groups of former teachers. They were characterized as having a secure career pattern. Once a stable phase of their career had been entered, they were reluctant to change jobs.

Those former vocational teachers who were characterized as having an insecure career pattern (more job mobility) had a life pattern that was different from those having a secure career pattern. This group had a much more positive attitude toward re-entering vocational teaching.

CONCLUSIONS

The following conclusions were drawn from the analysis and presentation of career pattern data of a selected group of 205 former vocational teachers.

1. The career choice for former vocational teachers was like the career choice of teachers in general as:

    a. former women vocational teachers decided to become a teacher somewhat earlier than did the men.

    b. the majority of the former vocational teachers did not decide to become teachers until after college entrance.

2. Nearly all of the women were family rather than education oriented.

3. As they exited, former vocational teachers who were not family oriented, tended to select occupations that were similar to their teaching subject matter area.

4. Women who were going to exit vocational teaching did so earlier than did men.

5. College seemed to operate as one route out of vocational teaching.

6. Advanced education tended to recruit vocational teachers out of classroom teaching.

7. The reasons that former vocational teachers gave for choosing teaching influenced their career pattern.

   a. Those who chose teaching for the interpersonal reasons were likely to teach longer before exit, were exhibiting both secure and insecure careers, and were likely to exit vocational teaching for non-vocational educational employment.

   b. Former vocational teachers who chose teaching for its intellectual dimensions exhibited secure career patterns.

8. Parental backgrounds were associated with the career pattern of the former vocational teachers.

   a. The higher the educational attainment of the parents, the more likely that the former vocational teacher would select teaching for its physical rewards.

   b. Former vocational teachers with residence in rural farm and rural non-farm areas in their formative years and those with less parental educational attainment exhibited cautiousness as they moved through and out of education.

9. Men were more likely than women to seek education beyond the bachelor's degree.

10. Extrinsic work values were higher for the former business teachers.

11. Former vocational teachers were likely to have a positive attitude toward a consideration of re-entering vocational teaching if:

a. they were former business or home economics teachers.

b. their career patterns were characterized as insecure by the Miller-Form Paradigm or as family or in-out career patterns by the descriptive approach.

12. Those former vocational teachers possessing a negative attitude toward re-entering were likely to:

a. be former vocational agriculture teachers.

b. have low parental social status and low parental educational attainment.

c. be characterized as having a vertical or cautious career pattern.

13. The basis for re-entering vocational teaching was:

a. full-time for those possessing insecure career patterns.

b. part-time for the secure career pattern holders.

14. Those former vocational teachers with insecure career patterns may be characterized as being social climbers. Their families exhibited less than average middle class attributes and they tended to climb in social status as they exited vocational teaching.

15. The critical choice points in the careers of former agriculture teachers seemed to occur during year four. This

point was reached nearly two years earlier in the careers of former business and home economics teachers.

IMPLICATIONS FOR VOCATIONAL TEACHER EDUCATION

These implications are drawn from findings from data gathered only from former vocational teachers. Thus, these findings cannot be generalized as being representative of all persons who chose to become identified with vocational education. There are two areas in which implications may be suggested for vocational teacher education. These are recruitment and in-service programs.

IT WOULD APPEAR THAT CAREER INFORMATION LITERATURE WOULD NEED TO BE DESIGNED TO REFLECT THE SPECIFIC FIELD OF VOCATIONAL TEACHING AND/OR A SPECIFIC GEOGRAPHIC REGION. It was observed that business teachers taught for reasons that were classified as being different from those reasons given by agriculture and home economics teachers. Also former vocational teachers with an urban orientation gave reasons for teaching that were different from those reasons given by persons with a rural orientation.

Another aspect having implications for recruitment was the time at which persons decided to become teachers. Recruitment literature, career programs, and other efforts to inform persons about the occupation of teaching are currently oriented towards high-school youth. Yet a large percent of the former vocational teachers did not decide to become teachers until after college enrollment. THUS, EFFORTS TO INFORM COLLEGE YOUTH OF TEACHING OPPORTUNITIES IN VOCATIONAL EDUCATION NEED TO BE EXPLORED. A review of the data suggested that these efforts should be directed towards second-year students and need to be different for men and women.

Can former vocational teachers be recruited back into vocational teaching? It would appear that those former vocational teachers who were family oriented and those who were classified as having insecure career patterns are the groups that might be receptive to being recruited back into vocational teaching. Large groups of the other former vocational teachers could be regarded as potential part-time staff for vocational programs. However, the research was left with the impression that few former vocational teachers were aware of the recent changes that had taken place in vocational education. IT IS SUGGESTED, THEREFORE, THAT THOSE FORMER VOCATIONAL TEACHERS WHO HAD SECURE CAREER PATTERNS COULD BE APPROACHED ABOUT RETURNING TO VOCATIONAL EDUCATION ON A FULL-TIME BASIS IF THE APPROACH IS PRECEDED BY OR SYNCHRONIZED WITH INFORMATION ABOUT THE PRESENT STATUS OF VOCATIONAL EDUCATION.

The peak exit rate was observed to occur during year two for business and home economics teachers but not until year four for agriculture teachers. Currently, agriculture teacher educators have a more extensive program of follow-up for their teachers than do business or home economics teacher educators. Does this account for the difference in peak exit rates? Data from this study could not provide an answer to such a question. Analysis of the data for the current study did, however, suggest that the later peak in exit rates for agriculture teachers could probably be attributed to their background. The former agriculture teachers had a background that included: (1) a rural orientation, (2) parental work that was classified as blue collar, and (3) low parental educational attainment.

IT IS SUGGESTED THAT THE IN-SERVICE PROGRAM PROVIDED BY VOCATIONAL TEACHER EDUCATORS NEEDS TO BE MAXIMIZED DURING THE PEAK EXIT YEARS FOR THE RESPECTIVE AREAS OF VOCATIONAL EDUCATION. Home economics teacher educators would probably find it advantageous to improve the time that home economics teachers spend on school duties (assuming that dissatisfaction with this area of teaching contributed to teacher exit). Business and agriculture teacher educators would probably find it helpful if means could be found in the in-service program to encourage their respective teachers to remain in teaching though they see their teaching future threatened by the peak salary that they could attain in teaching. This may be easier for agriculture than for business teacher educators. It may be recalled that former agriculture teachers chose teaching for its interpersonal dimensions, while former business teachers chose teaching for its physical dimensions. Agriculture teachers may respond to letters of "commendation" which accent their progress and achievements in working with youth. All vocational teacher educators need to be aware in planning their in-service programs that the recent college graduates tended to be more dissatisfied with the extrinsic factors of teaching than were those vocational education graduates of 1952 and 1956.

HYPOTHESES FOR FUTURE RESEARCH

A number of hypotheses for future research were derived from the study. These hypotheses are comprehensive and when operationalized should provide the directions for continued research efforts concerning the careers of vocational teachers. This series of research hypotheses are:

Hypothesis 1. Teachers of agriculture, business, home economics, and industrial education are in agreement as to the type of teacher they are. They agree that they are, in order; (a) teachers in general, (b) vocational teachers, (c) teachers in their respective subject areas.

Hypothesis 2. There is a "style of life" which influences career orientations of vocational teachers.

Hypothesis 3. The differences among the teachers of vocational education can be attributed to factors comprising a "style of life" rather than to an identification with a specific subject area.

Hypothesis 4. The elements contributing to a general "style of life" are factors such as geographical background, parental education, type of parental work and family social status.

Hypothesis 5. A "style of life" is influential for vocational teachers prior to the employment as a teacher.

Hypothesis 6. Former vocational teachers with an urban orientation: (a) are more receptive to returning to vocational education than are those with a rural orientation; (b) have a history of more frequent job changes than those with a rural orientation; (c) are the group most likely to be recruited back as vocational teachers.

Hypothesis 7. The differences among peak exit rates for the respective areas of vocational education may be attributed to the types of in-service teacher education programs presently existing in the respective areas of vocational education.

Hypothesis 8. The peak exit rates of vocational teachers may be manipulated to result in some of the leavers remaining longer in vocational classrooms.

BIBLIOGRAPHY

There are 61 references listed in the final report.